THE IRON AGE

THURSDAY, JULY 24, 1902.

The Scott & Sons Company Alligator Chuck.

While the alligator chuck designed and built by the Scott & Sons Company of 173 High street, Boston, is a radical departure from the ordinary chuck, it can be applied to any turret lathe having a hollow spindle and a swing of 12 inches or upward. It is suitable for the manufacture of almost all kinds of brass goods. It is so arranged that when a piece of work is chucked the lathe need not be stopped until all ends have been finished. This not only insures accuracy in the angles, but also saves the time lost by separate chucking for each end.

One movement of one lever serves to bring the jaws of the chuck toward each other to grasp the work. This operation is so designed that there is a certain leeway which takes care of any inequalities in size of stock. This means that if the casting or other article

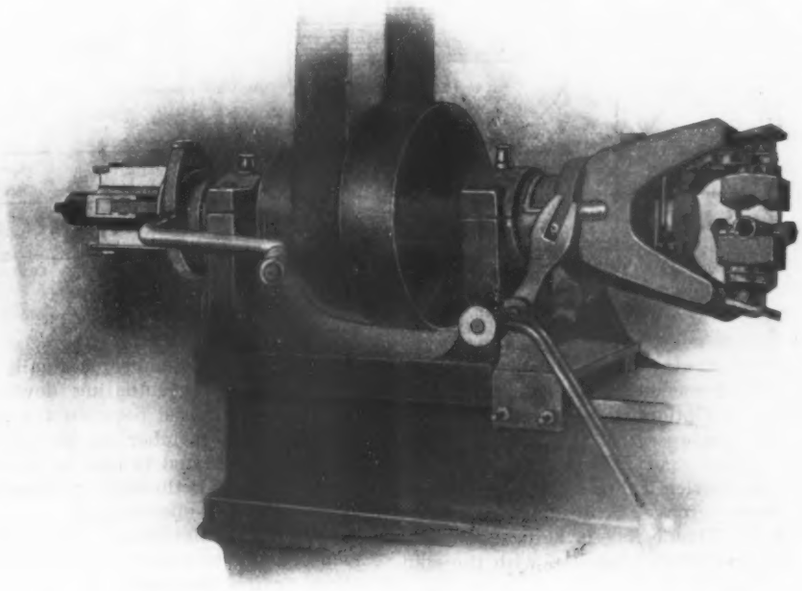


Fig. 1.—Jaws Open.

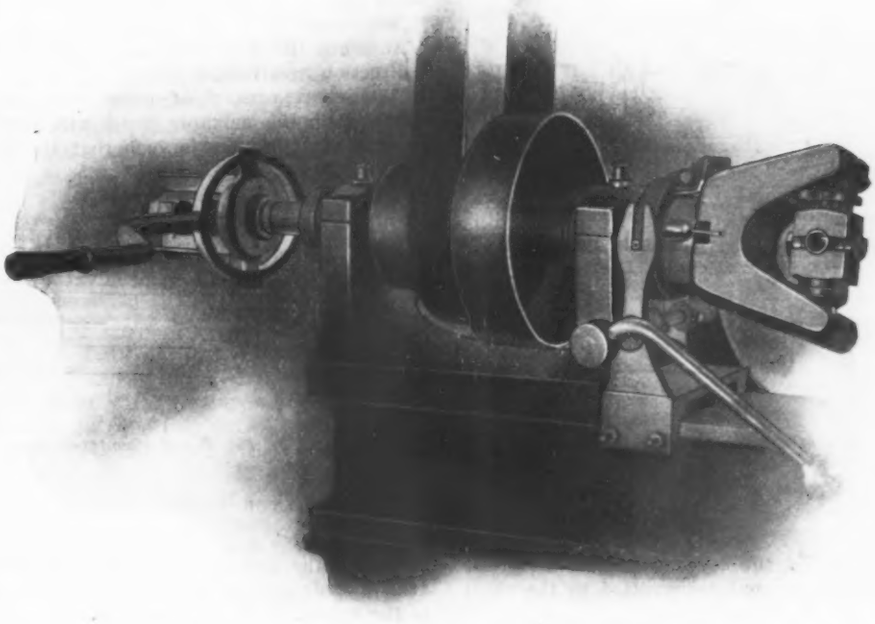


Fig. 2.—Jaws Closed.

THE SCOTT & SONS COMPANY ALLIGATOR CHUCK.

is a trifle too large provision is made to grip it just as firmly as if it were true to size. Having gripped the work the chuck itself may be made to move any part of a rotation, as may have been previously determined. If there are four parts to be operated upon by four turret tools, then the chuck is moved one-quarter of a turn for each tool. If there are six ends to be worked then one-sixth of a turn is made by the chuck. This illustrates the elasticity of the system. The first two engravings show the chuck opened and closed.

In the following description we shall first describe how the chuck jaws are operated and then how the chuck is turned.

The main actuating device *b*, Fig. 3, is a sleeve provided with a transverse groove, b^2, designed to receive the yoke or collar b^3. This collar is actuated by the lever b^4 to move it in a direction parallel with the spindle. This movement of the lever serves to close the chuck through the movement transmitted to the shaft B.

In order that the chuck jaws may be locked independently of the actuating handle b^4 and also that castings slightly differing in size may be firmly held without preliminary adjustment the main actuating device *b*, instead of being directly connected with the movable chuck member B, is connected through a supplemental actuating device, *c*, and co-operates in affording variable locking means whereby the supplemental actuating device is finally locked to the movable chuck member, the supplemental actuating device being arranged to be previously locked to the stationary chuck member at the end of a predetermined movement, after which a movement of the main actuating device relative to the supplemental actuating device may take place and result in a short but powerful additional movement of the movable chuck member before the movable chuck member is finally locked. As shown, the supplemental actuating device is embodied in a sleeve, *c*, interposed between the sleeve *b* and the stationary chuck member A, the movement of the sleeve *b* being transmitted to the sleeve *c* and to the movable chuck member B through the agency of a compensating device which co-operates with the several parts in such a way as to resist the movement of the movable chuck member, but to yield to a movement of the main actuating device, the parts all being locked together by pressure at the chuck jaws when the chuck is closed, but capable of being unlocked in response to a movement of the main actuating device. As shown, the compensating device is embodied in one or more levers, c^5, pivotally supported upon the supplemental actuating device *c* and so arranged that one arm of each lever bears against a portion of the movable chuck member B, substantially in line with the direction of movement of it, while the other arm bears against the sleeve *b* in a direction nearly transverse.

The short arm c^5 of each lever bears against a shoulder on the movable chuck member B. The axial support of the levers is such that the pressure of the

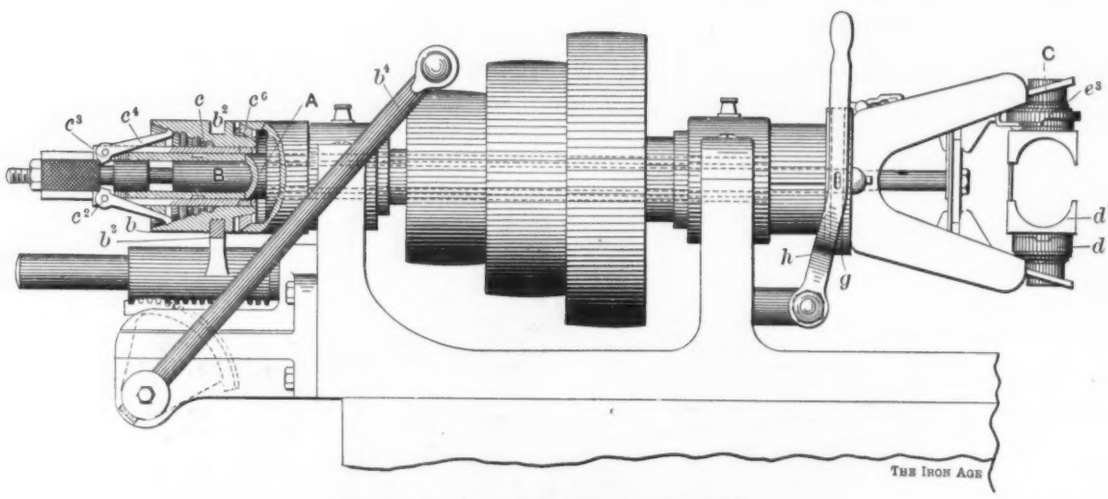


Fig. 3.—Sectional Elevation through Spindle.

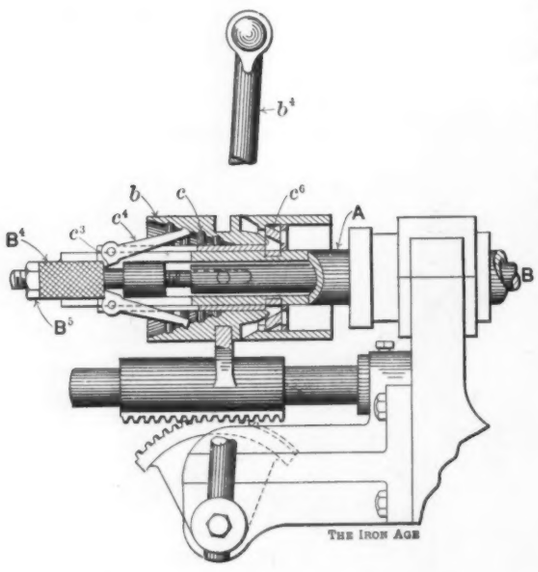


Fig. 4.—Details of Chuck Actuating Mechanism.

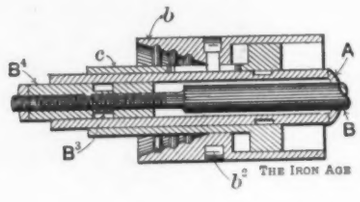


Fig. 5.—Horizontal Section Fig. 4.

THE SCOTT & SONS COMPANY ALLIGATOR CHUCK.

arm is in the line of movement of B, while the longer arms c^4 bear against an inclined conical surface formed in the sleeve. It will be seen, therefore, as the member *b* is moved to the left the resistance of B will tend to crowd the long arms of the levers into contact with the conical surface so that there will be a locking connection between the part *b*, the part *c* and the movable chuck member B, which is thus moved in a direction to close the chuck jaws. As soon, however, as the closure of the jaws is resisted by the article between them the device *b* will act as a wedge upon the lever c^4, crowding

them together and permitting the independent movement of the device *b* with relation to the device *c*. If, when this movement takes place, *c* is stationary with relation to A the short arm c^3 of the levers will engage the shoulders of B with a powerful grip, which firmly closes the chuck jaws.

The device *c* is arranged to be locked to the stationary chuck member A at the end of a predetermined movement by the pins c^4. If the article is so small as not to materially resist the closure of the jaws at the time when the pins reach their channel the mere fractional resistance or drag of the movable chuck member will tend to keep a continual pressure on the pins so that they will enter the channel as soon as they reach it. Therefore, the preliminary adjustment is so made as to leave a certain amount of lost motion to be taken up by the compensating device.

To adjust the initial portion of the chuck member with relation to its actuating means the position of the shoulder against which the short arm of the lever rests is made adjustable by a screw sleeve.

In order to unlock the chuck it is necessary to withdraw the pins from the channel. This is accomplished by moving *b* in a direction opposite to that which produced the closing of the chuck. All of the devices so far described rotate with the lathe spindle, with the exception of the actuating yoke b^3, so that the chuck can be operated regardless of the position or movement of the lathe spindle.

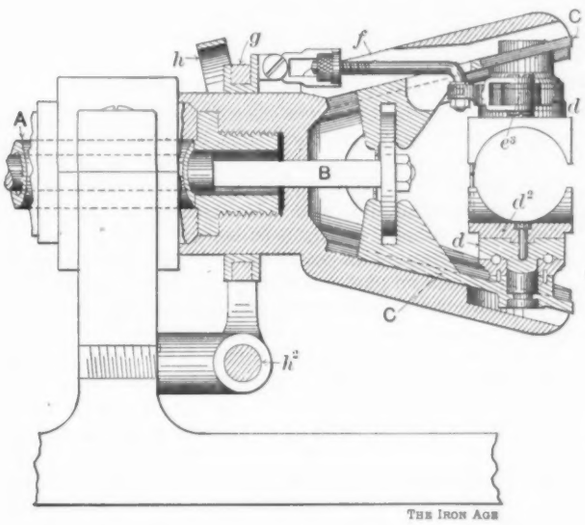


Fig. 6.—Sectional Elevation of Chuck Proper.

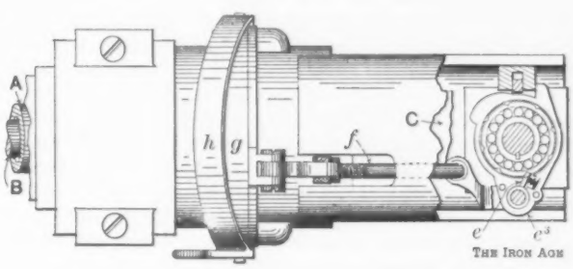


Fig. 7.—Sectional Plan View of Fig. 4.

THE SCOTT & SONS COMPANY ALLIGATOR CHUCK.

The Chuck.

To the jaws *d* are secured the blocks d^2, which are shaped to fit the article to be held. These jaws are mounted to turn in bearings in the slides C and are provided with ball bearings, as shown in Fig. 7. The jaws can be turned a certain part of their periphery without stopping the lathe and so bring different parts of the work in engagement with the turret tools. To accomplish this there is an operating device rotating with the lathe spindle, which is furnished with a stationary actuating device. The jaws are turned by a pawl, *e*, Fig. 7, engaging teeth formed in one of the jaws. This pawl is connected with a reciprocating part, e^3, the movement of which produces a step by step movement of the chuck. One of the jaws is formed with a stop to insure the stopping of the chuck in its proper position.

The part e^3 is operated by a link, *f*, attached to a sleeve, which is surrounded by a collar, *g*, connected with the lever *h*. This lever is in the form of a band surrounding the lathe spindle and pivoted at h^2.

When the chuck jaws are opened or closed to insert or remove the work the sleeve will simply travel forward or backward along the lathe shaft, the frictional resistance of the pawl being sufficient to prevent any operation of the member e^3 in response to such movement of the chuck members. When once the chuck members are locked, however, it is obvious that any movement of the sleeve will be transmitted without lost motion to the member e^3, so that by moving the handle of the lever *h* back and forth the operator can rotate the chuck jaws without stopping the lathe. To limit the forward rotary movement of the chuck jaws the member e^3 is provided with a shoulder adapted to come in contact with a fixed portion of the chuck frame, so that there is no danger of overthrowing in case the stop should fail to operate properly.

Owing to the ease and rapidity with which it can be operated this chuck will save a considerable percentage of the time usually consumed in chucking operations.

A Half Year's Fire Loss.

The fire loss of the United States and Canada in the first half of the present year continues the heavy record which has characterized it during the last two or three years, amounting to no less than $87,105,850, or an average of over $14,000,000 per month. The losses for the corresponding period of 1901 amounted to $88,926,150, and in the first six months of 1900 to $103,298,900. While the figures for 1902, so far, are slightly better than those for the corresponding period of last year, when the total was materially swollen by the great conflagration at Jacksonville, as the record for the preceding year was enlarged by the Hoboken disaster and several unusually great fires which occurred in that period, the present year's losses are deplorably great. The continuance of such heavy losses, in spite of all the efforts of the fire department, with their modern equipment, is a fact to be lamented. That between $150,000,000 and $200,000,000 worth of property is wiped out annually by fires, many of which must have been preventable, should secure some action by the city authorities and the fire insurance companies, with a view to the stricter enforcement of building laws and the encouragement of a more extended use of fire proof materials in the construction of new buildings. The past few years have been disastrous ones for the fire insurance interests, and it would seem to be time for those companies to exercise a stricter supervision, not only in their own interests, but also in the interests of the different communities in which they do business. A number of the weaker fire insurance concerns have gone under in the past two or three years by reason of their heavy losses; but those that are left are surely strong enough to carry out any salutary measures that may be decided upon in the interests of more effective fire protection in American cities and towns.

The Jackson Iron & Tin Plate Company were compelled to temporarily close their works at Clarksburg, W. Va., last week, on account of an accident at the power plant. The company are manufacturing coke tin plates almost exclusively. Their equipment consists of a bar mill, eight tin mills and five cold mills, with a tinning department containing 12 tinning machines. C. C. Moore is the general manager of the concern.

Scientific Tests of Alcohol Motors.

Combustion Proved Defective in All Explosion Motors —Corrosion a Danger with Alcohol Mixtures.

BY M C. KRARUP, NEW YORK.

In a recent article in this journal the status of alcohol as a source of power, mainly for automobiles, was discussed in a general way, with reference to the possibility that power users and manufacturers of automobiles in this country eventually might decide to follow the strong lead of Germany and France so as to establish a competitive market between the agricultural product (alcohol) of unlimited supply and the mineral hydrocarbons, gasolene and kerosene, of which the available quantity as well as the price must remain somewhat uncertain factors.

The Use of Carbureted Alcohol.

It was briefly mentioned that satisfactory results have been obtained from pure (90 to 100 per cent.) alcohol for certain heating and illuminating purposes, but that it had been found expedient with regard to the employment of alcohol in explosion motors to make a short cut for success by carbureting the liquid with gasolene, benzine or benzol, so as to be able to learn the peculiarities of the fuel in motor economy without making radical changes in the construction of the familiar gasolene motors in actual use. By the necessity of mixing the alcohol with equal volumes of benzine in order to obtain a good showing, the state of the art with reference to pure alcohol was sufficiently indicated as being still strictly experimental, but, on the other hand, the efficiency attained when using the mixture in motors intended for pure gasolene pointed unmistakably to some form of usefulness for alcohol in the desired direction. Whether this was to be reached by using pure alcohol in a limited number of specially built alcohol motors or by using 50 per cent. alcohol in a very much larger number of motors belonging to the existing types seemed relatively unimportant as to the main point at issue, which in Germany and France is that of encouraging the production and consumption of as large a quantity of native alcohol as possible, to take the place of a corresponding quantity of imported gasolene. A 50 per cent. mixture generally adopted would save France, for example, the importation of 8,000,000 hl. of gasolene (or the much larger quantity of crude oil from which French refiners produce it), while permitting the establishment of alcohol distilleries in her rural communities.

From the commercial standpoint the mixing system in other ways suited the needs of the hour. Besides facilitating experimenting it took the ticklish question of cost out of the open market for raw materials and current products, permitting refineries to turn out a special product for which the price could be set with an eye to the ultimate results expected of the alcohol agitation as well as to present profits. It imbued those refiners whose hold on the mineral oil market was weak with a strong hope of working up an exclusive business for themselves, and thereby enlisted their co-operation, which has proved very valuable. It also gave automobilists and other consumers an assurance of being able to obtain from the start a product of known and uniform composition, something which experience has shown it is difficult to secure with less specialized articles, such as pure gasolene or pure alcohol, the purity being relative, variable and subject to adulteration so long as the sources of supply are not popularly identified with the refiner's firm name and the genuineness protected in sealed *bidons*.

From the scientific engineer's standpoint the mixture system proved more satisfactory than expected, inasmuch as it soon disclosed two valuable facts: First, that variations in motor construction caused sufficiently marked variations in efficiency to permit close study of the causes in each instance, and, second, that these variations after all did not cover a much wider range than with gasolene and were fairly well within those limits to where shortcomings in economical and dynamic efficiency may be considered offset by advantages in durability, flexibility of power, convenience in operation, or other factors which cannot easily be expressed in figures at a test. Experiments with pure alcohol afforded much less material upon which to build, because in the much poorer results it was difficult to localize causes and effects, the diagnosis always relating to a complication of motor diseases.

The situation after the first trials held by the Minister of Agriculture of France, in October and November, 1901, was described in the official report of Max Rengelmann, the secretary of the contest. With reference to the brake tests of detached motors he says that "the discrepancies observed at the trials due to the variety of motor systems or motor details and the varying proportions in their principal dimensions show that there remain numerous investigations to be made, and that it is indispensable for the construction of excellent alcohol motors to take up a line of methodic research of scientific and practical nature adapted to throw light on certain points, such as the work of the carbureter with different kinds of fuel and under varying conditions, the influence of the compression of the charge, of the temperature of the cylinder walls, the rapidity of flame propagation, duration of explosion pressure, &c." In automobiles the best results were obtained in vehicles weighing more than 1000 kg., and in these the typical consumption was, according to the same official report, between 100 and 105 c. cm. of carbureted 50 per cent. alcohol per ton-kilometer.

Results of This Year's Tests in France.

An account of the more recent and more extensive trials held in May this year has been rendered by G. Coupan, one of the technical commissioners of the Alcohol Exposition, which followed after the tests of motors and automobiles, and adds greatly to our knowledge of the subject, partly because this was the first occasion when nearly all competitors used the same 50 per cent. mixture and partly because a chemical examination was made of the residues in the motors and of the exhaust gases.

In order to facilitate the understanding of this report and its importance it may be best to explain the nature and extent of the tests to which it refers.

On May 10, 20 "business automobiles" competed over a course of 85 km. from Beauvais to St. Germain, carrying useful loads according to their capacity. The consumption of 50 per cent. alcohol varied from 0.132 liter per ton-kilometer for a light Georges Richard truck weighing 973 kg. everything on, and 0.134 for a heavy truck made by the Société Naucienne weighing 3010 kg., to 0.312 liter for a Panhard et Levassor wagon weighing 4636 kg., and 0.325 for a Gillet-Forest vehicle of 1200 kg.

On May 15, 85 automobiles competed in a two-day race over 924 km., the first day's course being 412 km., from Champigny, near Paris, to Arras, and the next day's 512 km., from Arras to St. Germain, near Paris. Only 21 of the vehicles completed the course, but this was ascribed more to the extremely unfavorable weather and road conditions than to the use of 50 per cent. alcohol in the motors. No account was taken of fuel consumption in this race, speed being the only consideration. The speed varied from 72.280 km. per hour for a Panhard driven by Maurice Forman, to 27.380 km. for the last of the 21. A number of powerful vehicles which had been built originally to a weight exceeding 1000 kg., but afterward reduced to conform with a ruling of the Automobile Club de France making this figure the limit for racing vehicles, came to grief through breakage of gears and vehicle work.

The consumption trials for touring automobiles took place over a course of 730 km., which was divided into three relays. The speed was limited to 30 km. per hour. On May 15 the participants went from Paris to Arras over a 210-km. route (bringing the racing division and the touring division together at the end of the first day). On May 16 the route was from Arras to Abbeville, and on May 17 from Abbeville back to Paris. On May 20 a test of motor boats was held on the Seine, but out of 10 entries only two appeared, both equipped with Centaure (Panhard et Levassor) motors. These were the practical trials. They were followed on May 24 with an exposition comprising stationary motors and apparatus utilizing alcohol, as well as automobiles. This exposition

was continued for one week and furnished the occasion for scientific tests of the motors and other apparatus exhibited. In order to initiate the untechnical public in the origin and purpose of the alcohol movement there was also exhibited a complete plant for the production of alcohol from beets, as well as the manufacture of methylene for denaturizing it (rendering it undrinkable); and the methods of transporting it were shown.

In these elaborate arrangements for demonstrating the uses of alcohol the scientific tests of stationary motors and the results of the consumption trials for touring automobiles and business wagons are decidedly of greatest interest for determining the status of alcohol as a fuel for explosion motors. Especially the tests of stationary motors bring in new elements for consideration by constructors, giving for the first time an account of the chemical reactions which take place when alcohol forms part of the fuel. Incidentally they throw strong light on the imperfections of many gasolene motors, for any fuel, and this was possibly the most valuable feature of it all. From Mr. Coupan's report on this subject we take the following:

At the motor competition every motor was tested under the brake before the commission representing the Government. The conditions were those indicated as most favorable for faultless operation by each constructor. The tests were made at full load, at half load and running free, and each lasted one-half hour. The eminent scientist, Mr. Sorel, was specially commissioned to investigate the phenomena relating to the combustion and had installed a laboratory at the test station for the analysis of the fuel and the exhaust gas. At each test he took a sample of the fuel, whether it was the pure alcohol or the carbureted mixture. Both were furnished exclusively by Mr. Leprêtre, a refiner, and the variations brought out by analysis of the samples were so trifling that the composition could be considered constant in each class. The pure alcohol (containing about 6 per cent. of water) was known as "moto-schnick," the carbureted alcohol as "electrine." The carbureting element in the latter was benzol of coal and was not pure benzine of petroleum as at previous trials. By distillation this coal benzol would produce 94.5 per cent. of 100-degree benzine. The specific gravity of the carbureted mixture was 0.854, as against 0.843 of the benzine (gasolene) mixture used at the 1901 trials. The density of the pure alcohol was 0.834. The condition of inlet and exhaust valves after the tests was particularly examined in each case, as it has been one of the most frequent objections to alcohol that it would tarnish the inlet valve and even cause it to stick to its seat, after cooling down, as well as corrode the back flow valve. These phenomena were, indeed, observed during the competition, but only exceptionally, the valves in the good motors showing no special effects whatever. Some inlet valves remained absolutely clean, others were lightly tarnished with an imponderable and dry film. Occasionally these valves were covered with soot, dry in appearance, but containing traces of liquid carbides readily disclosed by heating in a test tube. In some motors, finally, a deposit of tar products was brought in evidence and, in one case, even the existence of no less than 1 c. cm. of liquid products.

"In the face of these pronounced differences the blame can hardly be laid to the alcohol," writes Mr. Sorel, "as in that case the effects would be identical on all valves. The carbureter is more likely to be at fault. It seems probable that when the alcohol is not vaporized, but merely pulverized, the spray upon touching the overheated valve will be suddenly decomposed, with an accompanying formation of carbides, so much richer in carbon as the temperature is higher and the contact more prolonged. Coke manufacture on a small scale!"

Corrosion to Be Guarded Against.

On the other hand, Mr. Sorel invariably found acetic acid in the products of combustion, though in greatly varying proportions. From this one would expect corrosion of the exhaust valves, but as a rule the valves showed no traces thereof, even when the acidity of the gases was pronounced. Only in a few cases—and these not apparently analogous—was there noticed the yellowish cast or the yellowish mounds which indicate an attack. In a single instance a clear case of corrosion of the exhaust valve was observed. "However," says Mr. Sorel, "since acetic acid is indubitably present in the gases, it is rather probable that stopping and cooling of the motor might induce the formation of a liquid which would attack and corrode the metal, and to be safe it would be advisable to lubricate the cylinder after the motor has been stopped and give it a few turns to prevent direct contact between the metal and the water formed by the condensation."

By an ingenious arrangement the exhaust pipe of each motor was tapped close to the cylinder and a volume of about 75 c. cm. was abstracted into a retort under elaborate precautions for obtaining a representative quality. Mr. Coupan describes the exact method followed, but this is not of sufficient interest at present in comparison with the results. The samples of gas of equal volume produced liquids by condensation in the retorts in highly variable quantities, and the subsequent analysis of the condensable products could therefore be qualitative only. The analysis of the remaining gases was made chiefly by direct dosing with absorbents, such as potassium, pyrogallic acid and potassium, chlorate of copper, acid or basic. The amounts of saturated carbides were determined after combustion in a Schloesing endiometer, the nitrogen as a remainder.

Combustion Incomplete.

The numerous experiments proved that in most cases a certain proportion of the carbon and the hydrogen admitted to the cylinder passed out in the exhaust without being utilized. The light, high speed, motors showed the poorest economy in this respect. The best among the heavy motors, which were the object of special attention by the jury on awards, required, it was shown, on an average one and one-half times as much air as theoretically necessary for the complete combustion of the carbon contained in either pure or carbureted alcohol. A somewhat smaller addition to the theoretical figure was required to consume the hydrogen completely. Still, the hydrogen is more exacting than the carbon in regard to the quantity of air supplied, for, as Mr. Sorel sums up the result of his observations on this point, "In proportion as the air supply is reduced below this limit and approaches the quantity theoretically indicated as necessary for complete combustion of gaseous carbon, the utilization becomes worse and worse for the carbon, and especially for the hydrogen, and the variations in utilization for the various motors, for any given excess of air, presents individual differences which increase in proportion as the excess of air over the theoretical requirement diminishes." The results of these important demonstrations (which evidently bear upon gasolene motors as well) were brought to the attention of visitors to the exposition by means of graphic charts on which the curves of averages enabled the observer to form a good practical estimate of the probable conditions for obtaining the best results from an alcohol motor when the carburization of the fuel is satisfactory.

That the combustion was incomplete in all the motors exhibited was shown by the invariable presence of acetic acid in the exhaust gases, and Mr. Sorel intends to follow up the experiments commenced at the exposition in order to arrive at more conclusive results as to the means for improving motors in this particular feature. So far as they have gone, his results agree almost too well with those reached by other methods by Max Ringelmann with reference to gasolene motors. The experiments of the latter, conducted since 1894, indicate the same necessity for an excess of air in gasolene motors beyond that theoretically required for the chemical reaction as found by Mr. Sorel for motors fed with pure or 50 per cent. alcohol, and his charts shown at the Alcohol Exposition presented a striking resemblance to those evolved during its progress by Mr. Sorel. Whether gasolene or alcohol was the fuel, bad mechanical results could be traced uniformly to poor combustion.

Gasolene and Carbureted Alcohol Interchangeable.

The coincidence in conclusions goes far to establish the doctrine, which now seems to be generally accepted in France, that gasolene (essence de petrole) and carbureted alcohol, containing at least 50 per cent. of benzine

or benzol, can be used interchangeably in the best gasolene motors, stationary as well as automobile, with the qualification that light, high-speed motors do better with pure gasolene, while the carbureted alcohol gives certain appreciable advantages in slow speed motors—all provided that the carbureter does its work properly.

Among the stationary motors those exhibited by Bronhot & Cie. earned special distinction from the jury on awards, who took in consideration not only the fuel consumption and the analysis of exhaust gases, but also the regularity of operation, ease of starting and other points usually regarded as essential. A Bronhot single horizontal cylinder motor weighing 535 kg. and of 1.83 horse-power (French unit) consumed 551 grams of 50 per cent. alcohol at full load per horse-power hour, and 426 grams per hour running idle. At half load the report credits it with the same consumption per horse-power hour as at full load, but for all other motors the efficiency at half load is notably less than at full load, as would be expected. The greatest efficiency is shown by another Bronhot motor, also single cylinder, horizontal, but of 16.34 horse-power and weighing 2615 kg. Its shaft speed was from 183 to 208 revolutions per minute (while the smaller motor varied from 282 to 305), and it consumed 233 grams of 50 per cent. alcohol at full load per horse-power hour, 308 at half load, and 2598 grams per hour running idle. With pure alcohol it consumed 340 grams at full load. Its nearest competitor was a 19 horse-power Winterthür (Switzerland) motor, weighing 2850 kg., the corresponding figures of which were 270, 387, 1695 and 384. All other motors showed a more marked increase in consumption when the fuel was pure alcohol, with one remarkable exception. This was a Pengeot 10.61 horse-power motor weighing 150 kg., and with a shaft speed of 756 to 845 revolutions; the report credits it with 548 grams of pure alcohol at full load against 583 of carbureted alcohol. Its piston diameter was 105 mm. and the stroke 144 mm. The same dimensions in the small Bronhot motor were 100 mm. and 200 mm., and in the larger Bronhot 240 mm. by 400 mm. Practically all the motors showed a similar proportion, however, between piston diameter and piston stroke, so that there is no foundation for ascribing extraordinary importance to this feature, except in so far as it relates to piston speed.

In a subsequent article it is proposed to institute a comparison in figures between results obtained with 50 per cent. alcohol at the trials for touring automobiles during the *Circuit du Nord*, as the automobile tests on this occasion were styled, and those recorded at the 100-mile trials held by the Automobile Club of America May 30.

Meeting of Malleable Iron Manufacturers.—About 30 of the malleable iron manufacturers met at Hotel Pfister, Milwaukee, on July 16, together with 10 or 12 representatives of pig iron firms. The circumstances gave rise to a report that a combination of interests was considered. A number of such gatherings, however, have been held on previous occasions, and while business matters were discussed, the pig iron situation especially being considered, it is understood that the meeting was largely social in its functions. It is known that several of the malleable foundries, even some of the most conservative, have placed orders for requirements, in whole or part, up to July, 1903—one lot of 50,000 tons having been contracted for during the week—and as the condition of the market for raw material is especially interesting now the presence of furnace representatives would indicate that pig iron was the most absorbing topic.

Shipbuilding During the Past Year.

The report of E. T. Chamberlain, United States Commissioner of Navigation, for the year ended June 30 shows that during the year 1657 vessels of 473,981 gross tons were built and officially numbered, compared with 1709 vessels of 489,616 tons for the previous fiscal year. The proportion of unrigged vessels (scows, canal boats, &c.,) included in these figures is shown in the following table:

	1902.		1901.	
	No.	Gross tons.	No.	Gross tons.
Steam and sail vessels of regular register	1,360	416,479	1,173	401,285
Unrigged craft (scows, canal boats, &c.)	297	57,502	536	88,331
Totals	1,657	473,981	1,709	489,616

Excluding the unrigged craft, the commissioner presents the following summary, by districts, of vessels built during the year:

	Wood.				Steel.				Total.	
	Sail.		Steam.		Sail.		Steam.			
	No.	Gross tons.	No.	Gross tons.	No.	Gross tons.	No.	Gross tons.	No.	Gross tons.
Atlantic and Gulf	583	65,265	290	19,021	8	9,223	62	102,647	943	196,156
Porto Rico	5	89	..	....	..	....	..	.....	5	89
Pacific	47	26,172	90	9,725	..	....	2	10,707	139	46,604
Hawaii	1	9	1	13	..	....	..	.....	2	22
Great Lakes	8	200	65	3,242	..	....	52	161,797	125	165,239
Western Rivers	6	114	134	7,927	..	....	6	328	146	8,369
Totals	650	91,849	580	39,928	8	9,223	122	275,479	1,360	416,479

The decrease compared with last year is in sail vessels and canal boats, barges, &c. This year's new sail tonnage is 101,072 tons; last year's, 128,099 tons. This year's new canal boats, barges, &c., aggregate 57,502 tons; last year's, 88,331 tons. New steel steamers aggregate 275,479 tons, compared with 235,265 tons last year. Included in the total new tonnage are 94 vessels, each of over 1000 tons, aggregating 315,062 tons, or two-thirds of the output. Of this large construction 41 steel steamers of 158,631 tons were built on the Great Lakes. The lakes have built for ocean trade two West India fruit steamers, Watson and Buckman, of 1820 tons each; one cargo steamer, Hugoma, of 2182 tons, and two large cargo steamers, Minnetonka and Minnewaska, of 5270 tons each, cut in two to pass the Canadian canals.

The output of completed steel steamers on the seaboard has been much below the indications of last July. The launching of nearly every large steamer has been delayed from three to eight months, and some are still on the ways which by this time were to have been in operation. The delays have been partly due to the steel strike last summer, to the great demand for structural steel in all directions, to low ocean freights and the lack of new shipbuilding orders, which has left builders and owners without motive for haste. Last July 255,000 tons of ocean steel steamers were under construction or under contract, while at present only about 160,000 tons are under construction, and no new large seaboard contracts are reported.

The year's new steamers on the seaboard include the Transatlantic liner "Kroonland," 12,760 tons, the largest vessel ever built in this country; the Pacific Mail liner "Korea," 11,276 tons, of 19 knots, the largest and fastest merchant steamer on the Pacific; "Shawmut" and "Tremont," of 9606 tons each, built for the opening trade with the Philippines, and "Alaskan," 8671 tons, for the New York Hawaiian trade, the largest vessel ever launched into Pacific waters. The sister ships, "Finland" and "Siberia," to the Transatlantic and Transpacific mail liners named, have been launched and will be officially numbered and in operation in the early autumn. Two steamers, "Nevadan" and "Nebraskan," of 4408 tons each, have been added to, and two more of 8000 tons each are building for the steam fleet to Hawaii around Cape Horn. The remaining nine new ocean steamers of 1000 tons or more are for local coasting trades.

The Whitaker Iron & Steel Company, Wheeling, W. Va., are adding three new sheet mills to their plant, which will give them a total of 11 mills.

A Queer Phenomenon in Melting.

BY G. P. BLACKISTON, PITTSBURGH.

The statement that a solid like iron or steel always melts from the inside, the outside being the last to be converted into a liquid state, will seem, no doubt, to many as ludicrous as in other days did Columbus' theory that the world was round. This statement, made as a fact, will be criticised by nearly all lay readers and by many connected with the melting of iron and steel, but after a few moments of thought and careful consideration it can be readily understood. It is more clearly demonstrated by the manufacture of tool or crucible steel than by any other process, as the material used for the charge is smaller and the amount used is not too great to experiment with.

Briefly, the fundamental principles of the crucible process are as follows: Pots made of black lead and clay are filled with the charge or mixture. These pots are about 2 feet high and about 10 inches wide in the widest portion. Of course each grade of steel has a special mix or charge, but commonly, in different proportions, are used a large amount of iron, blister bar, steel scrap, generally of crucible quality, and other ingredients. These are placed in the pots, the tops of which are covered with a cap of the same material. The pots are then placed into a furnace so constructed that the flames enter one side of the hole or furnace and pass around the crucibles, making their exit on the opposite side. In this manner they are thoroughly heated in about a temperature of 3000 degrees and their contents melted. The high carbon ingredients, such as blister bar and the high carbon tool scrap, are the first to melt, the muck iron being the last to reach a molten state, as it contains the lowest percentage of carbon.

Specimens of Stock Taken from a Crucible Indicate that Melting Begins from the Inside.

A QUEER PHENOMENON IN MELTING.

In making steel the pots remain within the furnace for quite a period after the contents are thoroughly melted; but in order to illustrate our experiment or statement we must remove one just before the steel entirely melts—about one and a half hours after it was placed in the furnace. If the contents are then cooled and removed from the pot the mass will have the appearance of being a conglomeration of all the charge, the different shapes and pieces being stuck together. After breaking several of these off they will be found hollow, with a little hole through the skin or outside shell, as shown in the accompanying illustrations, which are reproduced from photographs of such pieces. The shapes of the pieces will be as perfect as when placed within the pot, but the inside will be missing. Of course the center of the high carbon stock in such a case is hollower than that of the low carbon. Therefore the blister bar, which is very high in carbon, will only be recognized by a thin outer shell, the other steel scrap being regulated according to the carbon, the iron having just begun to melt.

Now as to the cause. All iron or steel bars, plates, sheets, billets, blooms or slabs have a trace of oxide upon the surface, which is formed during the period of cooling, after the rolling or hammering, or from moisture of some kind. When the charge is placed in the pots and they in turn are removed into the furnace an intense heat comes in contact with the iron or steel. Air being present in the pot an oxide forms upon the outside of each piece of steel or iron, and, being aided by the oxide originally upon it, it is given a greater melting point. There being no possible manner by which the center of the iron or steel can become oxidized to the same degree, its melting point is therefore not raised and it naturally melts long before the outside. This liquid finds or forces an opening through the outer skin and trickles down to the bottom of the pot. This in turn aids in making an opening for other pieces, and thus the process is continued.

This occurs in the open hearth as well as in the crucible process; in fact, it is true in all methods of melting iron and steel. There may be one exception, the writer not being positive, and that is in pig iron. There is, as a general rule, so much sand and other silicon material upon a pig that might prevent this action. This fact explodes an old idea—namely, that all forms of small pieces of steel or iron necessarily melt faster or quicker than large ones. A thin piece of sheet steel has so much less center to melt and so much larger surface to be exposed to the action of the oxygen than a large piece that naturally it would be longer melting. The outside of a thin piece of steel or iron requires the same heat to melt it as does the large piece containing the same amount of carbon. Thus fine scrap in the crucible process requires more heat and work than does the heavy material.

The Commonwealth Steel Company of St. Louis, Mo., are making rapid progress in the erection of their steel casting plant at Granite City, Ill., which will have an initial capacity of about 180 tons per day. The equipment is designed exclusively for the manufacture of specialties, and all material from the charging furnaces to the finished product will be handled entirely by machinery. The power will be both electric and compressed air, the latter being used to operate the molding machine hoists and the doors of the furnaces. In the open hearth plant the furnaces will be of special design, adapted to burn oil or gas. They will be of the basic open hearth type, and are said to be the first of the kind ever used in this country. The annealing furnaces will be equipped with double combustion oil burners, in which the combustion is so nearly complete that no chimneys are required. There will be a laboratory for making chemical and physical tests, and the finishing department will be equipped with hydraulic machines for each important casting before it leaves the works. The plant is expected to be in operation by September.

The American Brake Shoe & Foundry Company of New York have purchased the brake shoe plant of the Ross-Meehan Foundry Company at Chattanooga, Tenn. The purchase will in no way interfere with the business of the Ross-Meehan Foundry Company and the Southern Malleable Iron Works, which are under the same management.

The Iron Making and Shipbuilding Industries of Germany.—II*

Development of the Manufacture of Shapes.

The development of the manufacture of shapes received a still stronger impulse than that of plates as soon as the valuable properties of the basic method of manufacture for this special purpose became generally known.

We now have 21 steel works that are fitted for rolling heavy shapes, the majority being supplied with complete sets of rolls for the production of the sections of the German standard section book for structural purposes up to 21⅝ inches. The output of these latter, having sections of 3⅛ inches or upward, has increased immensely within the last decade. Its amount was as follows:

1888	about 344,500	tons.	1895	about 641,700	tons.
1889	" 393,700	"	1896	" 799,200	"
1890	" 386,800	"	1897	" 850,400	"
1891	" 366,100	"	1898	" 957,600	"
1892	" 409,400	"	1899	" 1,082,600	"
1893	" 491,100	"	1900	" 974,400	"
1894	" 552,100	"	1901	" 839,500	"

The retrogression which has taken place during the last two years is due to a lull in the activity of the building trade. As far as I am aware, there is no exact record in figures in existence as to the part borne by the shipyards in the placing of orders for sections before the year 1897, and I can only establish the conclusion that the absolute amount, and still more relative amount, of such orders was very small in proportion to the large general output.

If we look for the beginnings of the making of heavy shapes for shipbuilding it is, according to my information, probable that Engineer Fritz Asthöver, in Essen, was the first who took up this branch of the industry. In the years 1866 to 1870 shapes for shipbuilding were made under his direction, at the Steinhauser Hütte of Witten, for the Prussian Naval Administration, and this was looked upon as a clever performance. The sections at that time were those of unequal sided angle iron of various widths of flange, such as 3 x 9 x ⅝ inch in lengths up to 60 feet; also those of [, T and bulb iron up to 11 inch.

Somewhat later iron works on the Saar, under the management of Siegfried Blau and Julius Buch, took up the manufacture of these sections. The difficulties which there presented themselves were the greater that the available raw material contained a considerable proportion of phosphorus. The types of section were similar in the two cases. Herr Blau writes me, among other things, the following: "With what difficulties of a technical nature it was necessary to contend may be seen from the circumstance that 8, 9 and 12 inch bulb iron was originally produced by the Butterley Works, in Yorkshire, by a very clever welding together in the direction of the length of T iron with bulb iron. This welding was, as a matter of fact, very cleverly performed, and in this manner bars up to 50 feet in length were produced. At a later date this method gave place to that of direct rolling. I had very great difficulty with my weak rolls of that period in producing without flaws the lengths, ranging up to 50 feet, then required.

"The greatest stress was laid on the good outward appearance of the manufactured article, and especially on its admitting of being easily welded. All the above named sections were used as deck beams for war vessels, and for this purpose their webs had to be split for from 3 feet to 6.5 feet, in the direction of their length, at each end, so that the half web and the bulb could be heated to a cherry red and turned with a sharp bend downward, having sometimes also to be welded to a stout angle iron. The deck beams thus produced were then riveted direct to the frames of the vessels. I have never had any difficulty with the welding qualities of my beams, but difficulties were at first put in my way on account of the outward appearance of my shapes, or at least because their appearance was different from that of the Butterley beams."

*See *The Iron Age*, July 17, page 23.

At a later date the Friedrich Wilhelmshütte, in Troisdorf; the Phœniz, in Eschweiler; the Rothe Erde, near Aix-la-Chapelle, and some other works took up the manufacture of material for shipbuilding. For some time, however, after malleable iron for shapes for building purposes was replaced by mild steel the German makers could not get a firm hold on the requirements of material for shipbuilding. The reasons for this were of various kinds. It was, no doubt, due to the peculiar circumstances incident to the development of the German shipbuilding industry, which had first to make the most of the much more advanced English shipbuilding industry, that German shipbuilders at first gave the preference to a material which had proved itself to be good, and they cannot be blamed for having exercised the greatest caution in placing orders for steel material in Germany.

Another reason for the preference shown by the German yards for English material was to be found in the fact that the German rolling mills did not possess the sections required in shipbuilding, for the making of which the English mills had, in course of time, gradually laid down the necessary plant. The dimculty lay in the circumstance that the German rolling mills naturally could not persuade themselves to adopt, for shipbuilding purposes, the English sections, which were arranged according to English measure, after they had proved the excellence of the German standard sections as applied to building purposes. Their efforts were, moreover, directed to persuading the shipbuilders to adopt German standard sections. Added to the above came a further drawback in the manner of quoting prices for shipbuilding material in vogue at the German works. The German shipyards could, in negotiating for English shipbuilding material, apply to middlemen, who are accustomed to undertake the delivery of the whole quantity of rolled steel required for the hull of a vessel at a price, and to cover themselves by running contracts with different rolling mills, so that they are in a position to distribute the specifications as they come in among the various mills as these are able to undertake the work. It must here be remembered that the English steel makers and rolling mills can depend upon being able to distribute at least from 20 to 25 per cent. of the total amount of steel produced by them among the shipyards, a quantity so great that in the course of years many capable middlemen have found it worth their while to lay themselves out specially for the buying and selling of shipbuilding material. In Germany there was not sufficient opportunity for this, because the quantities of material of the various sections were so small.

These amounted to scarcely 2 per cent. of the German steel production, a quantity so small that it did not tempt a middleman to come forward, nor the works to make special arrangements by the cutting of costly special rolls, for its supply. The yards accordingly had to direct their inquiries to the works themselves, and could then only obtain quotations for fractional parts of their requirements. After this they had to put the various quotations together, and in many cases to submit to alterations of sections, while sections that could not be obtained in Germany had, again, to be bought in England, risk being run thereby that such fractional orders could only be placed at higher prices than usual. It must be admitted that this incomplete system of obtaining quotations, with its troublesome accompaniments, caused great delay and hindrance to the course of business in the shipyards, especially in cases of urgency.

To all this must be added the heavy drawback of the high rates of carriage in increasing the price of the material.

In recognition of these different circumstances, which stood in the way of the use of German car section material in shipbuilding, the principal aim of the iron makers was directed toward the determining and bringing into use of standard sections suitable for shipbuilding. In the Normal-Profilbuch für Walzeisen (Standard Section Book for Rolled Iron), which, in the year 1883, was revised by the Verband deutscher Architekten und Ingenieure (Association of German Archi-

tects and Engineers) in company with the Verein deutscher Ingenieure (Association of German Engineers), the sections for shipbuilding purposes had already been included. In the discussions on this matter representatives of the Imperial Dockyards, of the private yards and of the classification societies had taken part. It was further declared, in a communcation addressed on March 27, 1883, by the Imperial Admiralty to the Revising Committee, that the Admiralty were satisfied with the proposed angle and bulb steel sections, which fulfilled all the requirements of war and merchant shipbuilding, and the committee were at the same time enjoined to take the necessary steps toward the further development of the matter, it being very urgently desirable that the rolling mills in question should at last be put in a position to make the necessary arrangements

Before proceeding to cut the necessary rolls the works attempted to obtain definite promises from the Imperial and private yards that the newly established sections would really be used in shipbuilding, but they received only vague answers in return. In spite of this one of the works decided to make the attempt and had rolls made for three bulb sections, but the discouraging result of this was that they never received a single order for material to any one of them.

Here the matter rested until March, 1890, when once more, at the suggestion of the works, supported by the Association of German Shipbuilders and the classification societies, new proposals for standard sections for shipbuilding were put forward by the representative of the Germanischer Lloyd. In this case also, however, the proposals and all attempts of the works to come to a definite result proved fruitless. These circumstances, so unsatisfactory for the iron works, at last underwent a change for the better when the plate mills decided to undertake the delivery of material jointly. At the same time some very desirable reductions were made in the rates for the transport of material for shipbuilding. Representatives of the works that proposed to lay themselves out for the delivery of ship shapes then met and came to an agreement as to the conditions under which they could undertake joint delivery and the final step was taken in January, 1898, in the settlement of sections suitable for shipbuilding. In the course of the general discussions, which took place in Berlin in January, February and March, 1898, and in which the representatives of the Imperial Navy, the private yards and the steel works also took part, the following sections were discussed and finally decided upon:

Equal sided angle sections	20	in number.
Unequal sided angle sections	44	"
Common bulbs	10	sections.
Angle bulbs	8	"
T-bulbs	9	"
[-sections for deck beams	8	"
[-sections for deck frames	7	"
Strap angle sections	7	"
Z-sections	6	"
Half-round sections	15	"
Ornamental sections	9	"
Railing sections	3	"
Jackstay sections	1	"
Funnel stiffening sections	5	"

The various works at once proceeded to have rolls made for the above, and the newly introduced sections were ready to be used for the four mail steamers, one high speed passenger steamer, two line of battle ships and two N. G. Lloyd steamers, the contracts for which were given out in June and July of the same year. This, however, was only rendered possible by the alliance of the iron makers, the various works being only in this manner put in a position to make a suitable division of the work so that the deliveries of material for these vessels, which were all placed on order at the same time, could be effected at the proper times.

All the sections, with a few unimportant exceptions which had not hitherto been included in the specifications, have meanwhile been cut into rolls.

The deliveries also have increased in a gratifying manner, as may be seen from the following statistics, supplied to me by the works, acording to which there were delivered in the form of shapes:

	Tons.
From July 1, 1897, to June 30, 1898	14,817
From July 1, 1898, to June 30, 1899	
From July 1, 1899, to June 30, 1900	22,560
From July 1, 1900, to June 30, 1901	30,382
From July 1, 1901, to December 30, 1901	21,887

That German material, in proportion to that from abroad, continued to come more and more into use in German yards is further to be seen from the statistics also given for shapes by the Association of German Shipyards. The 22 associated shipyards ordered:

	From home makers.		From abroad.		Total.
	Tons.	Per cent.	Tons.	Per cent.	Tons.
1899	34,488	75.7	11,069	24.3	45,557
1901	51,621	92.7	4,052	7.3	55,673

A circular inquiry, kindly sent round to the German shipyards by the acting chairman of the Schiffbautechnische Gesellschaft (Shipbuilding Technical Association) elicited the almost unanimous answer that the parties interested were thoroughly satisfied with the deliveries, as to condition no less than as to quality of the material, and that the German works bid fair to succeed in giving effective help to the German shipyards in their endeavor to further our shipbuilding.

A New Molding Process.

The steel casting industry, which has made such wonderful strides in this country within the past decade, may be said to be still in its infancy, bright minds in the trade continuing to evolve new and still more wonderful ideas. One who has contributed in no small degree to this advancement is Frederick Baldt, Sr., general manager of the Penn Steel Casting Works, Chester, Pa. Mr. Baldt has discovered many new and important processes that have raised the standard of steel casting to a high point, but that he has not been content to rest upon these laurels won in the past is demonstrated by recent achievements. For months he has been engaged in developing ideas that have resulted in the introduction of a system of steel molding that promises to revolutionize the process.

Patents were recently issued to him that will materially simplify the molding of steel. The method consists in first making a master mold from any pattern and then casting from this as many fusible patterns as may be required. This fusible pattern is then put into an iron box of suitable size, after which, by means of compressed air, the box is filled with molding sand. The box is then run into the drying oven, where the fusible pattern is melted out. The casting is then made from the dried mold.

An important feature of this process is that it does away with skilled labor, the sand being conducted and driven by compressed air into all parts of the box and fusible pattern by either boys or laboring men. Since the castings are absolutely seamless and without fins, no chipping is required afterward. The process is also particularly applicable to the casting of chains and similar interlocked articles. By this process it is also practicable to produce articles in exact duplicate and in any number.

New Reversible Pneumatic Drill.

The Chicago Pneumatic Tool Company, Fisher Building, Chicago, have placed on the market a new reversible drill of the Little Giant type. This machine was designed primarily to meet the wants of those who required a drill for general use, but whose work was not sufficiently specialized to warrant the purchase of an exclusive reaming and tapping machine of this type. The motor is of the same general construction as all those used by this company, the distinguishing feature being four single acting pistons coupled to one crank shaft at an angle of 90 degrees. All moving parts are in an oil-tight case and each pair of cylinders is controlled by one balanced piston slide valve. To this has been added a simple reverse valve so situated that it does not interfere with the feed screw when the machine is used as a simple drill. The controlling lever may be removed from the motor when the reversible feature is not required. The machine can be controlled with the ordinary throttle, which is situated at the side. The reverse valve can be used as a throttle valve, however, when very rapid and accurate reverse motion is required, as

would be the case if the motor were used in connection with machine for tapping to a given point or to bottom.

All the bearings are furnished with removable bushings. The crank journals have been increased 50 per cent. and the crank pinion is shrouded on both ends. The upper and lower bearings for the crank shaft are of bronze. Oil plugs have been dispensed with and the oil is now poured in through the handle. A leather packed stuffing box is supplied to keep the oil from escaping.

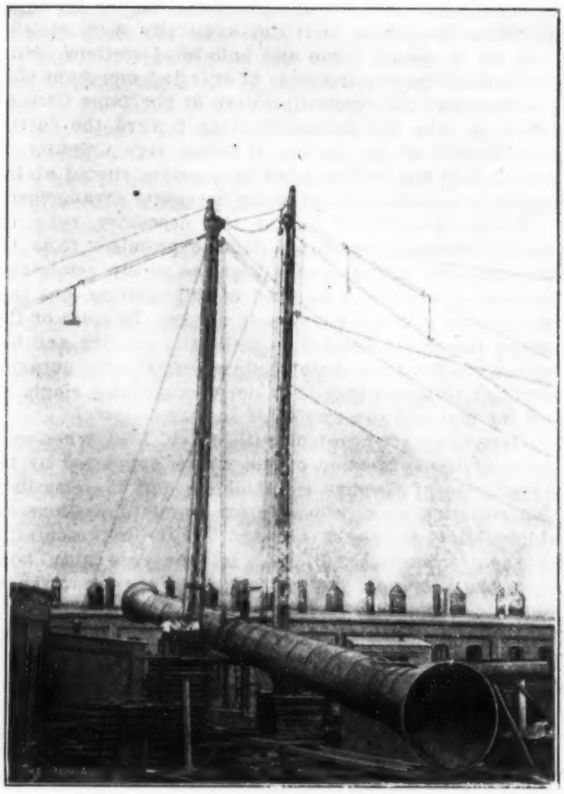
Novel Method of Erecting a Steel Stack.

An interesting and somewhat unusual method was recently employed in the erection of a new self sustained steel stack built by the Franklin Boiler Works Company of Troy, N. Y., for the New York Central & Hudson River Railroad for use at West Albany, N. Y. As will be noted from the accompanying illustrations, the entire stack was raised into position at one time instead of building it up in short sections as is usually done. The stack is 140 feet in hight, with a diameter of 10 feet at its base, tapering to 5½ feet about 12 feet above the base. It weighs approximately 16 tons exclusive of the base plate, or 21 tons in all. An ornamental copper top 6 feet high relieves its otherwise too severe appearance, and a light ladder runs from the base over the top.

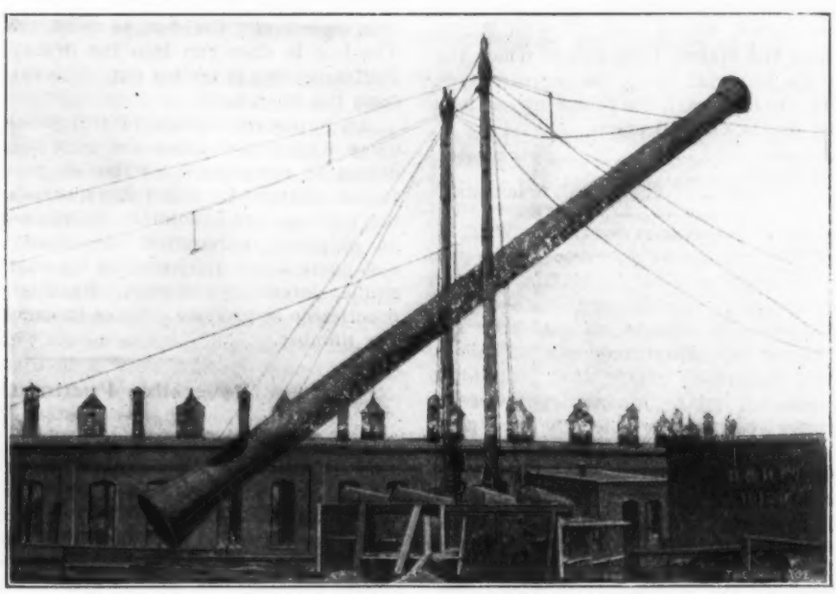
At the builders' shops the stack was riveted in 30-foot lengths. These lengths were loaded on flat cars and conveyed to the exact location desired, a temporary track having been laid from the West Albany freight yard to the site.

While the stack was being made at the shops a concrete foundation was being laid for the stack. It is 10 feet in depth, and eight anchor bolts 2½ inches in diameter were imbedded in proper position. The base plate was then placed in position. On the east and west sides of the concrete foundation, and as close as possible to it, two gin poles were erected and securely anchored by means of heavy guy ropes. Each of the poles was formed of two heavy trimmed pine sticks from 14 to 16 inches in diameter and 50 feet high, firmly lashed together with 1-inch ropes at distances of about 18 inches. From the head of each of the gin poles tackles were run through quadruple blocks and run down to similar blocks at their bases ready to be attached to the stack. Each of the 16 strands thus obtained was easily capable of raising a ton.

Upon the arrival of the stack in sections unloading was commenced, beginning with the top section and following this with each of the lower ones in regular order. As the sections were unloaded they were moved along cribbing extended from the car track over the stack foundation and between the gin poles. The ornamental top was then put in place, and the sections riveted together until the entire stack lay as a unit ready to be raised.



Adjusting the Tackle.



Raising the Stack.

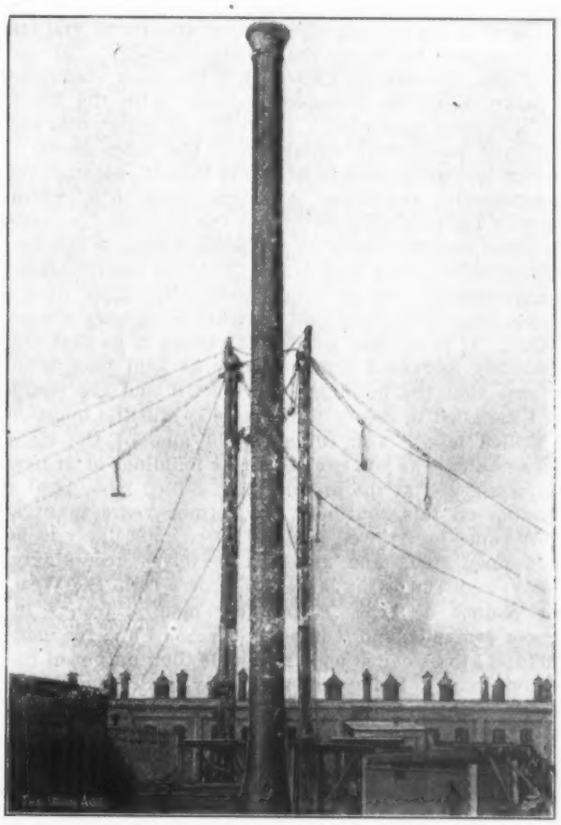
NOVEL METHOD OF ERECTING STEEL STACK.

Considerable discussion had been conducted with the railroad company as to the advisability of the method of raising this stack and putting it in position as a whole, rather than of adopting the more common practice of erecting it course on course in position. The builders determined to employ the former of the two

methods, arguing that with proper care no increased risks would be entailed, and that a shop built stack was always preferable on account of the superiority of hydraulic riveting and the better opportunities offered for examination and inspection of the work while in progress.

As soon as all was ready for the raising a careful final inspection was made, and then the great blocks were attached to numerous hemp cables stretched around the stack just above the center of weight. The signal was given to two gangs of men, one on each of the winches near the base of the gin poles, the cables tightened and gradually the top began to leave its horizontal position and move upward. As it rose, a gang of men began to make preparations for pushing the lower end into place over the base plate.

During the early part of the raising an accident occurred, which, had it come later, might have been serious. The upper end had risen some 20 feet when, without warning, one of the strands of rope forming the hoisting tackle on the west gin pole parted. Immediately the stack fell back to its horizontal position. Fortunately, in falling, the ladder attached to the outside of the stack had been turned underneath. The ladder struck first, in this wise breaking the shock and saving the stack proper from any injury whatever. Of course, the ladder was badly bent, and the ornamental top slightly dented. These defects were soon remedied, and a few days later the second attempt at raising was made. This was entirely successful. Gradually with straining cables the great stack rose to the perpendicular, and was fitted over the base plate, to which it was firmly riveted. After careful adjustment the tackles were withdrawn and the work completed.



Erected.

NOVEL METHOD OF ERECTING STEEL STACK.

One entire day was consumed in raising the stack, and part of another in adjusting it. The saving in time and labor made by the builders fully justified the method, however, and stamped the work as a complete success. It is interesting to note that under all of the strain of raising the deflection of the stack itself was scarcely noticeable.

After exhaustive tests of new pieces of rope similar to the one which parted, the calculations of the builders were entirely verified, and the breaking of the strand during the first attempt could only be attributed to some defect contained in the rope.

The stack is to be used in connection with four 125 horse-power Franklin water tube boilers. Its capacity when free draft is permitted, however, would be sufficient for twice this power.

Shenango Valley Iron Notes.

SHARON, PA., July 19, 1902.—The tin mills of the Sharon Steel Company have resumed after being closed down two weeks for repairs. They employ 1600 men. The National Malleable Steel Casting Company's plant has also received extensive repairs and resumed operations.

The frame work of the new cement plant being erected by the Stewart Iron Company is about completed. This will be the first plant in the Shenango Valley to make cement from furnace cinder.

D. M. Forker, who has for several years been a superintendent for the Republic Iron & Steel Company at Birmingham, Ala., has resigned and has returned to his old home at Sharon.

The Stanley Electric Company of Pittsfield, Mass., have secured the contract for the generators and transformers for the installation now being made by the Ellwood City Power Company at their power plant on the Connoquenessing River, near Ellwood City, Pa.

The development of electric traction in the Mahoning and Shenango valleys is surprising. The recently completed New Castle & Lowellville Railway has nearly every car crowded with passengers, operating both limited and local passenger cars and a freight and package car service. The limited cars run from New Castle to Youngstown in 45 minutes. The Youngstown & Sharon Electric line is also meeting with excellent financial success. It has a 40-minute service between Youngstown and Sharon, and already it seems to require a double track. A franchise has been secured for another line to Sharon and work will shortly begin on its construction. T.

Garland Nut & Rivet Company.—The Garland Nut & Rivet Company of Pittsburgh have made application for a charter of incorporation. Among the incorporators are John W. Garland and Robert Garland. These parties are connected with the Garland Chain Company of Rankin Station, Pa., and purpose to erect a large plant at West Pittsburgh, near New Castle, Pa., for the manufacture of nuts and rivets. Contracts for the buildings and equipment are now being placed. The main building will be about 700 feet long and 75 feet wide, and will be equipped with modern machinery for the manufacture of nuts and rivets. At the present time the Garland Chain Company are making rivets in their works at Rankin Station, Pa., but when the new works at West Pittsburgh are completed the rivet department will be removed from Rankin Station to the new plant. The officers of the Garland Nut & Rivet Company are: John W. Garland, president; Robert Garland, treasurer; Alfred Sang, general manager, and Edgar Dunn, general superintendent.

The Leonard family, famous in England and Wales for their iron foundries during the sixteenth and seventeenth centuries, some of whom came to this country in 1651 and established a foundry in Massachusetts, and two years later started the first foundry near Rahway, N. J., will raise a memorial at Taunton, Mass., where many of the family have since continued in business, which shall have its foundation stones laid on the two hundred and fiftieth anniversary of the establishment of the industry in America. The monument will cost between $150,000 and $200,000, and will be placed in the square.

Canadian Manufacturing News.

Steel Production at Sydney.

TORONTO, July 19.—James Ross of the Dominion Steel Company, says that the output of the works is increasing and the cost declining. Large exportations are being made to the United States, and the steel is being sold in all parts of Canada. There are now six open hearth furnaces in operation, and the daily output of steel averages about 400 tons. The second of the blast furnaces has been relined and is about ready to be blown in. The third of the furnaces will then be relined. Mr. Baker, superintendent of the works, says the entire production of billets and slabs has been sold for some time to come. Two steamers are regularly employed carrying steel to the United States. Regular shipments of pig iron are also being made. In the month of May furnace No. 4 produced 8023 gross tons, and for the month of June its daily average was 263 tons. Work at the rail mill is progressing. It is expected that the manufacture of rails will be commenced about the end of the present year. Two thousand four hundred men are now employed by the company.

Nova Scotia Steel & Coal Company.

A meeting of the directors of the Nova Scotia Steel & Coal Company was held in Montreal on the 16th inst. Senator Jones, Robert Jaffray, Hon. J. S. Pitts, B. G. Harris, Graham Fraser, J. D. McGregor, Thomas Cantley, J. C. McGregor, George F. Mackay, and Harvey Graham were present. A report covering the first half of the present year was submitted by the managing director. It showed that the several departments of the company's business were being operated satisfactorily. A modern coal shipping pier with a storage capacity of 5000 tons has been completed at North Sydney. The pier is very advantageously situated for loading, there being a depth of 30 feet of water at low tide along the shipping side, so that the largest steamers afloat can be bunkered promptly. With seven chutes aboard, coal was loaded recently at the rate of 100 tons a minute. Provision has also been made for the loading of sailing craft from chutes where there is not sufficient depth of water for steamers to load. Coke ovens, with auxiliary washing plants, are in operation at Sydney mines and Ferrona, turning out an article that is superior in quality and sufficient in quantity to supply the needs of the company. At Trenton the steel plant, according to the managing director's report, is crowded with orders and every department is working full time. Good work is being done by the company's ten time charter steamers, each averaging 5300 tons total deal weight capacity. Two freight steamers, to be used in hauling coal from Sydney mines to the St. Lawrence and Lower Province ports, have been purchased in Scotland. The rapid opening and development of the company's No. 2 colliery give promise of a larger output during the rest of the year. The quality of the coal has been tested and found to give very favorable results for steam and bunker purposes. Work on No. 3 colliery of the old Sydney mine's main seam has been in progress for some time. It is expected that the company's annual output will soon amount to 1,000,000 tons.

A Granite Ware Grievance.

On Thursday evening the hardware section of the Ontario Retail Merchants' Association met and prepared a programme of subjects to be discussed by its members at the convention of the Retail Merchants' Association, which is to be held in Toronto on September 9 and 10. Arrangements were made for the reading of papers by prominent hardware merchants from Hamilton, London, St. Thomas, Berlin, Waterloo, Peterborough, Kingston, Belleville and Ottawa. Titles of some of the papers will be "What Profit Should the Retailer Place Upon His Goods?" "What Percentage Should Be Added to the Cost to Cover Expense?" and "The Unsatisfactory Condition of the Granite Ware Business." The subject indicated by the last of the above-mentioned titles drew out some rather strong expressions at the meeting, and it is likely to be treated with great plainness of speech at the convention. Of the two grades of granite ware the second is regularly passed off for the first by some of the representatives of the manufacturers, and the difference, not being superficial, is not easily detected when the goods are new, save by an expert. What the retail hardwaremen desire is the stamping of the goods. This they will doubtless be able to secure if they bring their collective influence to bear upon the matter. The relations between wholesaler and retailer will also be taken up in a paper.

Ontario's Trade with the West.

Several Toronto manufacturers have been interviewed by the Toronto *Globe* as to their preparations for trade with the Canadian Northwest. Two of the interviews with the heads of companies whose products are made from iron and steel are here given:

Mr. Edward Gurney of the Gurney Foundry Company: "Our trade with the West, and by that I mean Manitoba and the Territories, is 100 per cent. in advance of what it was six years ago, with every indication of continued steady growth. The demand upon us, of course, is for cooking and heating apparatus, and our resources are taxed to the utmost capacity. Almost every manufacturer in Canada has the same statement to make regarding increased business with the West; it is a natural sequence of the influx of population and continued prosperity. Ontario and the older parts of Canada generally cannot help but benefit, because the manufactories are there. All signs point to a continuance of the present growth, and the problem for many Canadian manufacturers at the present time is the limitations under which they labor. Take an establishment manufacturing lines in which mechanical labor of the highest class and costly and intricate machinery are essentials. It is no easy matter to extend it so that tremendously increased demands may be kept pace with. Suppose that the buildings are erected and the equipment installed in record time, there is still the question of skilled labor. You cannot build men of the right kind as quickly as you can erect new buildings or fit new equipment, and at the present time skilled labor is at a premium on this continent. In former years manufacturers could pretty well gauge the demands likely to be made upon them and govern themselves accordingly. To-day, and it is owing largely to orders from the West, they cannot do that. Every few months brings increased demands, and it is no uncommon thing for manufacturers to be called upon to double their output of the previous year." Referring specifically to British Columbia, Mr. Gurney said that trade with that province had also shown a satisfactory increase of late, though not to the remarkable extent noticeable in Manitoba and the Territories.

Henry Abell of the American-Abell Engine & Thresher Company, referring particularly to trade with Manitoba, said: "We have never yet been able to keep up with the orders we have received from Manitoba for threshing machinery, and of late our trade is branching out into the Territories, where the indications are that we shall do a large business. Our trade with the West this year is double that of one year ago, and indications point to a still larger increase in the future. Business in Ontario is also very good."

Mr. Abell was asked if the company had considered the advisability of increasing their plant and staff in view of this expansion of business. "We have not only considered it, but we have already decided on such a course," he answered, "and will do so this year in the hope of being able to keep pace with the ever-increasing demands, particularly from the West. Manufacturers in the older parts of Canada have every reason to feel gratified with the practical results following on the growth in population in the West, and the development of that part of the country."

"Our business with the West has increased right along for the last two or three years," said a member of the Ontario Wind Engine & Pump Company, "and we think that the prospects for the future are very bright. We feel that it is a good country for our line of goods. The conditions are not the same as in manufacturing centers of Ontario, because the West is an agricultural country, and as the ground is taken up and cultivated the farmers look to this part of Canada for a considera-

ble portion of their supplies. We increased our building, plant and staff last year, but do not find that our capacity is larger than the demand upon us, and in fact feel that still further expansion may be necessary in the future because business in Ontario and elsewhere beside the West is bright."

Minor Notes.

A syndicate of English capitalists is being organized, it is reported, to acquire coal properties near the areas of the Gowrie and Block House collieries at Port Marion, Cape Breton.

Mr. Clergue says that 500 tons per day are being turned out regularly by the Sault steel mill, and 1000 tons per day could be sold in Canada if the mill was producing so many.

A proposition has been submitted to the Town Council of Brockville, Ont., by William Billingham, of Montreal, to establish works in the town for the manufacture of malleable iron and steel, in consideration of a bonus of $50,000 and exemption from taxes. Three hundred hands would be employed. A committee has been appointed to look into the matter.

D. H. McHenry, engineer in chief of the Canadian Pacific Railway Company, has been instructed to arrange for the immediate building of the Hochelaga shops. Tenders are being called for. Four car shops for freight and passenger coaches and one planing mill are to be put up.

It is expected that the Algoma Central Railway will be completed to Michipicoton Harbor early in December.

It is expected that the works of the Montreal Rolling Mills Company, destroyed at Acadia Mines, will be rebuilt in the early future. The rolling mills had been running on full time, and several large contracts for iron pipe kept the pipe works busy. Five years ago the blast furnaces connected with the property were closed down and the work in the rolling mills was stopped at the same time. Three years ago the latter were purchased by the Montreal Rolling Mills Company, and since then active operations have been carried on in the pipe mills.

To put an end to the trouble caused by the straying of ranch cattle between Assiniboia and Alberta, on one side of the line, and Montana on the other, the Dominion Government thinks of building 100 miles of wire fence along the border.

The construction of new shops to take the place of those of the Canadian Pacific Railway, destroyed by fire at Perth, is to be begun at once.

Pascal Amesse's foundry, 60 Nazareth street, Montreal, was burned down last week. It will be rebuilt.

The Ontario Government diamond drill, which has been working for some time on iron and gold locations in the neighborhood of Sunbridge, has been ordered to the township of Falconbridge in the Sudbury district, where it is to be used in exploring lands in which some Buffalo men are interested.

A party has been dispatched by the Dominion Government to explore the country north of the Albany River, which is a northwest boundary of Ontario. Large mineral deposits are believed to lie in that part of Keewatin.

Sir Peter Walker, of Oswaston Manor, Ashbourne, Derbyshire, and the Hon. Herbert Allsopp passed through Toronto some days ago on their way to Sault Ste. Marie, to confer with Mr. Clergue. Their visit has to do with a project for establishing another large industry at the Sault.

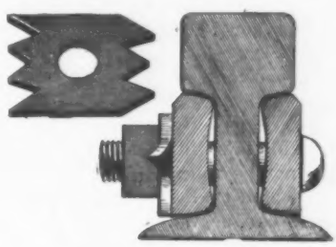
Isaac Butler, a director of the Panteg Steel Company, near Newport, Monmouthshire, and of the Landore and Elba Steel companies in Swansea, has been visiting the Sydney Steel Works. The companies he is connected with have recently been amalgamated as the Baldwins, Limited.

J. W. Parks, of A. & F. Parks Company, Limited, of Birmingham, tool manufacturers, whose house does a large business in Canada, is now in the Maritime Provinces. He says there is a probability that his company will establish a branch office here. C. A. C. J.

Mrs. I. E. Tutts, who is the manager of the Arizona Power Constructing Company, is one of the prominent electrical engineers of the Southwest. She has constructed various electrical plants now being successfully operated in that part of the country, and the company under her management are now reported to be starting work on one of the largest power enterprises ever attempted in the Southwest. The Arizona Power Company were incorporated last spring for the purpose of supplying power to Prescott, Jerome, Big Bug, Lynx and other towns of the Arizona mining district. The power will be obtained from Tossil Creek, about 52 miles from Prescott. The company have built a generating station and constructed long distance transmission lines to conduct the electrical power to the towns above named. This is stated to be but the beginning of a series of similar developments. Mrs. Tutts is said to have already completed plans for several more systems ranging in size from 2500 to 12,000 horse-power capacity.

The Hanvey & West Nut Lock.

The Jenison Iron & Steel Shops, Limited, Grand Rapids, Mich., are placing on the market the Hanvey & West nut lock. The engraving shows the soft steel plate nut lock, having four locking points on one end and three on the other end. The two center locking points are made slightly bent up, so as to readily admit a chisel point to bend up the locking point. The company claim that these nut locks have been thoroughly



Soft Steel Plate Nut Lock.

THE HANVEY & WEST NUT LOCK.

tested on many railroad lines and in the most heavily worked yards. They are manufactured in any length, breadth or size suitable for any place or purpose.

The British Iron Trade Outlook.

The London *Iron and Steel Trades Journal* for July 12, referring to the quarterly meeting of the iron trade at Birmingham, England, July 10, says:

Not for three years has the Birmingham quarterly meeting been held under circumstances so favorable for the future of the trade, and although the market was quiet there was a general idea of better trade and better prices in the immediate future. The course of trade in the United States is a matter of considerable importance to our industry, and it is mainly on this account that business is so restricted when in other directions all appears to be plain sailing. During the past few weeks increased purchases of pig iron and steel have been made for the American market in the north of England and Scotland, and it needs but little more of this business to force up the price of raw materials here, even though our producers and consumers alike are averse to wide fluctuations in values, and would much prefer steady trade at reasonably remunerative rates to being tossed about by the marvelous gyrations in American trade. In the first half of this year we shipped 155,000 tons of iron and steel to the States against 56,000 tons in the six months of last year, and including 82,000 tons of pig iron and 20,000 of steel, against 20,000 tons and 5000 tons respectively in the first six months of 1901. Looking at the short supply of pig iron and steel for our own works, and the fact that we ourselves have to get pig iron and steel from the Continent, it looks as though it will be a doubtful advantage to our manufacturing industries if the American

market takes increased supplies of pig iron or steel from us. In such case there must be a considerable advance in prices, and it is the possibility of such an event and the certainty of its effect on values that causes producers to be extremely cautious about entering into contracts for forward delivery.

Great Lakes Commerce.

Important Innovation in Ship Construction.

SAULT, STE. MARIE, MICH., July 21, 1902.—At the American Shipbuilding Company's yard here this week a vessel was launched that is expected by ore transportation managers to work a very material change in methods. It is the "Hoyt" of the Provident Steamship Company, of which Vice-President Wolvin of the Pittsburgh (United States Steel) Steamship Company is manager. The usual lake ore carrier is equipped with hatches running across the deck and 8 x 36 feet in size, spaced with 24-foot centers the length of the deck. This spacing is adopted because of the spacing of ore dock pockets at shipping ports, which are built with 12-foot centers. It has been found at Conneaut, where the Hulett clam shell unloader is in use on the ore docks, that with hatches of 24-foot centers a considerable proportion of the ore must be shoveled to the hatch or taken out in less labor saving ways than by the Hulett unloaders. The "Hoyt" has her hatches spaced 12-foot centers, double the number on other vessels of her size, and it is expected that 95 per cent. of the cargo can be taken out with the clam shell unloader and without shoveling. In a cargo of 6000 tons only about 300 tons will be left for shoveling. This is so little that the probability is it will frequently not be touched, but will remain in the vessel. It is expected that a cargo handled thus by the Hulett unloaders can be taken out of a vessel in four to five hours. As these unloaders require the service of but two men, and as a set of them can handle from 12,000 to 15,000 tons of ore daily, the saving over old methods is obvious. The usual charge for handling ore out of ships on modern docks is 15 to 16 cents per ton, shoveling alone costing 10 cents. The licensees of the Hulett unloaders pay Mr. Hulett 1 cent per ton and their expense above that, including the enormous first cost of the machines, is but a few cents. So that in addition to the vast saving in time and the freedom from possible demands of that most arrogant and at times unreasonable of labor organizations, the Ore Shovelers' Union, the actual cash saving is very great. If the "Hoyt" proves successful ore ships with hatches spaced 12 feet apart will be the rule.

An effort was made a short time ago to secure greater freedom of action for the Hulett clam shell by building a ship in which the deck stanchions should be bent away from centers to permit free swinging of the clam buckets. This was attempted in the fine ship "James Gayley," built last year, but was not altogether successful.

The Hulett Ore Unloaders.

So far there is on lower lake receiving docks but one set of Hulett unloaders, that built for the Carnegie docks at Conneaut two and three years ago. These machines were expensive, each of the three costing about $40,000, and the first built was not entirely successful, but Mr. Carnegie and his associates felt that they were on the right track and persisted in changes till the machines worked perfectly. This year machines of the same type will be built at ore receiving docks at Buffalo, Erie, Cleveland and Ashtabula, so that nearly all the Lake Erie ports will be fitted with them by another season. In this way the capacity of the present lake fleet for handling iron ore will be increased by at least 25 per cent., for the vexatious delays at receiving docks will be materially reduced. These lower lake receiving docks have been the gauge for ore handling on account of the fact that the facilities of these docks have been the first factor to give out when crowded by ore. Not only will the capacity of docks thus be increased, but the labor problems will be simplified to a degree. The crowds of shovelers on Lake Erie docks will be replaced by the steel and steam of the Hulett unloaders, which require the service of but two men, both machine operators.

Activity in Shipbuilding.

A great many more ships will doubtless be built on the lakes for next season's business than the 20 now contracted for. Various independent interests not yet represented in contracts made are now preparing to close deals for ships of the 5000-ton class, and there is practically no doubt that lake shipyards will all be full of work for the winter. Messrs. Brown, Leither, Hawgood, Clergue, and others will contract for these ships, aside from the ten Canadian canal vessels already ordered by Capt. A. B. Wolvin. The half dozen big yards of the American Shipbuilding Company will be especially full of new work in addition to the customary repairs. If the "Hoyt's" deck plan proves successful this latter item may be larger than expected. This ship was launched with engines in place and practically ready for sea, so that in a very short time she will be tested. What will be done with all the big new ships is a puzzle to the layman. There already seems to the unpracticed eye to be a superfluity of them. But these builders are the most experienced men in the business, and they study the traffic situation with the utmost care. It is very evident they look for a continuance of the rapid growth that has characterized lake transportation and regard the 30,000,000 tons of Lake Superior business in 1902 as simply a milestone along the course toward bigger things.

The Government Helping Lake Commerce.

The Government is also planning greater works than ever for the facilitation of great lakes commerce. A new 1000-foot lock at the Sault, to replace the smaller, Weitzel, lock, and to be larger than the enormous Poe lock, is the next step. This will doubtless come very slowly. Further improvements of the Sault River below the canal and of the connecting channels above and below Detroit will also be carried out. Compensating works in the shape of submerged dams at the foot of Lakes Huron and Erie will probably be one of the early steps to preserve water levels in those lakes. At the various larger harbors the Government is now constructing works of a nature entirely different from their former temporary character. The substantial concrete entrance piers and breakwaters at Buffalo, Duluth, Marquette and elsewhere are in point. A still larger one will be erected at Superior at once. It will be a pair of entrance piers each 3200 feet long and of Portland cement concrete from the foundations, 22 feet below surface, to the top, 10 feet above. This will be the largest job of concrete work ever undertaken by the United States Government and will require an immense quantity of cement. Bids are to be called for the coming winter, but the work may be done by day labor. It will be under charge of the engineers' offices at Duluth.

D. E. W.

New Buffalo Hand Blower.

The Buffalo Forge Company of Buffalo, N. Y., have placed on the market a new portable hand blower embodying several new features. It is supported on a rigid cast iron standard, and so fastened as to allow ready adjustment. The mouth of the blower may be turned to any desired angle of discharge. The blower is of the standard Buffalo constructon with balanced blast wheel. A train of inclosed spur gears, accurately cut, speed the blast wheel up in the proper ratio. These gears are inclosed and run in a dust proof case. The shafts are of steel. In addition thorough means are provided for the lubrication of all parts. The frame is made tight, so that oil to the depth of about 1 inch may be maintained at the bottom of the case. In this the three gear wheels constantly revolve, and, throwing the oil over all the reciprocating parts, afford ample lubrication to the bearing surfaces. All the parts are detachable and interchangeable, and may be packed into a very small space.

More Liberal Drawback Regulations.

WASHINGTON, D. C., July 22, 1902.—The Treasury Department has issued a series of drawback regulations during the past week, in which the practice is established of allowing parties who are not themselves manufacturers to present applications covering goods to be manufactured for their account by others. Regulations issued upon such applications may be utilized only by the applicants and drawback entries will be liquidated only upon the order of the parties to whom the regulations have been issued.

Iron Paving Blocks and Brake Shoes.

In the case in point W. M. Greenwood of New York applied for regulations covering drawback of duty paid on imported pig iron to be used in the manufacture of iron paving blocks and brake shoes. The duty on the pig iron is $4 per gross ton, and the waste in manufacture is such that a gross ton of pig produces a net ton of castings, or a loss of 12 per cent., but in order to secure the Government the Department limits the waste allowance to 10 per cent. The iron paving blocks to be manufactured under these regulations will vary in weight from 6 to 25 pounds each, while the brake shoes are to be made in various sizes, and no weights are stated for them. Both paving blocks and brake shoes will usually be shipped for export in bulk, but at times they will be boxed or crated or shipped in barrels. The drawback allowed will be equal to the duty paid on the imported pig, less the legal deduction of 1 per cent.

When shipped in packages the preliminary entry must show the marks and numbers of such packages, with their contents and their gross and net weight, which must also be marked thereon. When shipped in bulk the entry must show the number of articles of each kind exported, the average weight of each size, respectively, and their aggregate net weight.

The drawback entry must show the total net weight of the exported merchandise and the quantity of imported pig iron consumed in the manufacture. The entry must further show, in addition to the usual averments, that the merchandise was manufactured of material and in the manner set forth in the sworn statement.

In liquidation the weight of imported pig iron which may be taken as a basis for allowance of drawback may equal the quantity consumed, as declared in the drawback entry, but in no case shall it exceed the net weight of the exported merchandise, officially verified, with 10 per cent. of such weight added thereto to compensate for loss incurred in the manufacture.

Steel Wire Rods.

The Department has also prepared regulations on the application of the National Wire Corporation of New Haven, Conn., for drawback of duty paid on imported steel billets used in the manufacture of wire rods. The preliminary entry is required to show the number of coils of wire rods exported and the net weight of the same. A tag must be attached to each coil, marked to show its net weight. The drawback entry must show the aggregate net weight of wire rods exported and the weight of imported steel billets consumed in the manufacture. In liquidation the weight of imported steel billets which may be taken as the basis for allowance of drawback may equal the quantity consumed, as declared in the drawback entry, but in no case shall it exceed the net weight of the wire rods exported, officially verified, with 3½ per cent. of such weight added thereto to compensate for loss incurred in the manufacture.

Aluminum Wire Rods.

Upon the application of the Pittsburgh Reduction Company, the Treasury Department has prepared a series of regulations providing drawback on the exportation of aluminum wire rods in coils manufactured wholly from aluminum ingots, imported in a crude form, by casting the crude ingots into wire bar ingots and rolling the same into rods of required diameter. The preliminary entry is required to show the number of coils of aluminum rods exported and the net weight of the same. Each coil must have a tag attached thereto marked to show its actual net weight. The drawback entry must show the aggregate net weight of the wire rods exported, and the weight of aluminum in condition as imported used in the manufacture. The entry must further show, in addition to the usual averments, that the exported rods were manufactured of material and in the manner set forth in the manufacturer's sworn statement. In liquidation the quantity of aluminum in condition as imported, which may be taken as the basis for allowance of drawback, may equal the quantity used as declared in the drawback entry, but in no case shall it exceed the net weight of the exported rods, officially verified, with nine-tenths of 1 per cent. of such weight added thereto to compensate for loss incurred in the manufacture.

Steel Box Straps.

The general tendency toward liberalizing the laws is shown in another series of regulations about to be issued upon the application of the Cary Mfg. Company of New York, establishing a rate of drawback on box straps manufactured wholly from strip steel imported in coils and paying a duty of 8-10 cent per pound. On the application of this same company the Treasury Department nearly a year ago granted an allowance of drawback of duty paid on sheet steel used in the manufacture of box straps, the sheets as imported being cut into strips, riveted with domestic rivets, and embossed and wound into coils of uniform length. The cutting of the sheets into strips was regarded by the Treasury officials as the most important feature of the process of manufacture, and when this company proposed to import steel in strips instead of sheets the question was raised whether the mere riveting together and embossing of such strips could be treated as a "manufacture" within the meaning of the law as recently construed by the courts. After careful investigation, however, the Department has decided to allow drawback.

The preliminary entry is required to show the marks and numbers of the shipping packages and the contents of each package, stating the number of coils contained therein and the length, width, gauge and net weight of the same. The gross and net weight of packages must be marked thereon and shown in the entry. Each case must be marked further to show the number of coils contained therein and the quality or size number of the same. The drawback entry must show, separately, the net weight of coils of each size and gauge exported ,and must further show, in addition to the usual averments, that the exported merchandise was manufactured of materials and in the manner set forth in the manufacturer's sworn statement. In the liquidation of entries the weights of strip steel as imported, which may be taken as bases for allowance of drawback, may equal the net weights for each size and gauge of coil, as declared in the drawback entry after official verification; provided, that in no case shall such weights exceed those set forth for coils of corresponding size and gauge in the manufacturer's sworn statement hereinbefore mentioned. Samples of the steel in the exported straps may be taken, or sworn samples furnished, as ordered by the collector, for required determination.

W. L. C.

Combination of Sheet Metal Working Machinery Concerns.

The Universal Machine Company, Canton, Ohio, who are pioneers in the manufacture and invention of long length conductor pipe, long length chain pump tubing and long length eave trough machinery, and who are also the original inventors and manufacturers of wire eave trough hanger machinery, have combined their business with that of the Canton Foundry & Machine Company, a large and prosperous concern employed in the manufacture of heavy and light castings for all purposes. The combined company are erecting large new machine shops adjoining the foundry and installing therein a full equipment of the most modern and improved machinery. The factory is centrally located in the city of Canton, on both the Pennsylvania and Wabash Railroad systems, and is close to all freight depots. The company are therefore in the best position

to serve the numerous factories in their own city, and especially the sheet metal concerns, for which Canton is noted, and for whom they do a large amount of machine work. The Universal Machine Company number among their customers all the manufacturers of conductor pipe and eave trough in the United States, besides those in many other countries, as well as many sheet metal working concerns.

Central Pennsylvania Industrial News.

HARRISBURG, PA., July 22, 1902.—There is little to report for this part of the State except the settlement of some labor troubles and some turning down of orders by managers, who are confronted with the problem of getting out their work promised for 1902. In this city several contracts which had penalty clauses were refused point blank and in others longer limits were insisted upon. The coal strike is still affecting operations, as fuel is scarce and there is trouble in securing materials as rapidly as needed. The slowness in delivery of coke is holding back furnace production.

In connection with the improvements to be made to the works recently bought by the Eastern Steel Company at Pottsville it is said that the old Pioneer furnaces will be repaired and made ready for blowing in at an early date, and the open hearth department will be completely overhauled. William Melhorn is in charge of the repair work. The company will make a number of changes, including the building of a large water plant. The Berlin Bridge Company, who occupy part of the works, will remove shortly. It is believed that part of the old Fishback Works will be running soon.

The shareholders of the National Brass & Iron Works, Reading, will vote on September 19 on a proposition to increase the capital stock from $200,000 to $550,000. If this plan is carried there will be some notable changes made in the works at Reading.

The McClave & Brooks Company, recently incorporated, are building a $60,000 plant at Scranton and will commence work in the new establishment this year. The plant includes a machine shop, 160 x 180 feet; storehouse, 100 x 180 feet; blacksmith shop, 30 x 40 feet; storage building, 170 x 176 feet; with engine and boiler house, pattern shops, pattern storehouse, oil and asphaltum storehouse, cupola and office buildings. The company manufacture blowers and grates and will have a fine plant of steel and iron buildings.

The improvements to be made to the Lalance & Grosjean tin plate mills in this city, whose cost was mentioned in *The Iron Age* last week, will consist of a 15-ton crane, five new annealing furnaces, two new gas producers and 50-kw. and 75-kw. electric dynamos.

It is said that plans are under way for the building of a large blast furnace at DuBois. It will make an important addition to the industries there.

Among the orders recently booked by the Harrisburg Foundry & Machine Works are 100, 125 and 150 horsepower engines for the new Shoreham Hotel at Washington; a 300 horse-power engine for the Myles Salt Company at Weeks, La.; two 300 horse-power Harrisburg standard compound direct connected engines for the new shops of the New York Central & Hudson River Railroad at Oak Grove, Pa.; a 200 horse-power engine for the Spartan Mills at Spartansburg, S. C., and a small engine for Reiker's brewery, Lancaster, Pa.

The Delaware, Lackawanna & Western Railroad have bought from the Lackawanna Iron & Steel Company the old North mill site at Scranton. The railroad company will use it for shops. The Delaware, Lackawanna & Western have also decided to build large shops at Keyser Valley, near Scranton, and will start work on them at an early date.

The Brooke Iron Company have blown out No. 2 furnace at Birdsboro until after the anthracite strike is over.

The Lehighton Foundry & Machine Company will build a large plant this fall. The present officers are Eugene Barr, president, and Charles Swartz, superintendent and general manager.

There have been some strikes in York County of late, but none of great moment, and the general industrial condition in that country is good. Almost all of the works in York city are working day and night and large export trade is reported by every firm engaged in the agricultural implement business.

The rolls of the Pennsylvania Steel Company show 8332 men for the first half of July, all of these men being at work at the Steelton Works. The company have occupied the greater part of the additional buildings at Highspire, a suburb of Steelton, where the bridge shops are said to be among the finest in the world. The frog, switch and signal department is also installed in some of its new buildings. The company works have been busy, although the tardiness of delivery of fuel is felt to some extent.

The American Iron & Steel Mfg. Company are improving their Central Works at Lebanon. The mills are being overhauled and the puddle mill is being equipped with new boilers. Several of the other Lebanon mills are being overhauled this summer. The new company who will operate the plant of the Norristown Iron Company, now being removed to Lebanon, will be known as the Lebanon Valley Iron Company.

The Emaus Furnace of the Reading Iron Company will probably start in a few days. The stack repairs were completed last week and a large stock of coke was accumulated during the suspension of the furnace. It has been banked for several weeks.

Bricks and material are being delivered for the new pipe mill of the Susquehanna Iron & Steel Company at Columbia. Work is to be started soon, according to reports. The company's mills and furnaces are all in operation. Several other Lancaster County plants, however, have not been so fortunate and a number of mills have been closed this summer for labor troubles. Plans are under way to settle several of them. S.

A Wire Tramway of Unusual Hight and Span.

The A. Leschen & Sons Rope Company, St. Louis, have built for the American Gold Mining Company of Ouray, Col., a wire tramway of unusual proportions. The line is 4200 feet long, extending from the works of the mining company in the valley up 2000 feet to the mouth of the mine. Any other mode of communication is impossible. The line consists of two stationary sustaining cables securely anchored at each end. The loaded buckets run on a rope 1⅛ inches in diameter, while the empties return on a 1-inch rope. The buckets are propelled by an endless steel wire rope, ¾ inch in diameter. This rope passes around one 8-foot sheave at both terminals of the line, the one at the mine having a number of grips which clamp the rope tightly and afford the means to control the speed of the tramway when in operation. To this wheel are attached the brake bands for stopping the tramway or controlling it.

The buckets are attached and detached automatically to and from the traction cable by means of clips, button shaped, which are attached permanently to the cable. Each of the buckets has a capacity of 6½ cubic feet, and they are so placed in the pendant as to swing freely, thus allowing them to be dumped at the lower station of the line as described later.

The difference in elevation between the two terminals of the tramway is about 2000 feet, and the weight of the loaded buckets traveling down is sufficient by far to operate the tramway by gravity, and in addition has sufficient force to bring supplies up to the mine. About midway of this tramway is placed an intermediate station, so designed that later on it can be used for loading ore from another mine located near by. This station is situated in a position where snow falls very heavily, and for that reason the entire length of the terminal for a considerable distance on each side is covered with a snow shed.

At the lower terminal of the line the tramway consists of a single span 2100 feet in length. This is the most remarkable feature of this tramway. Owing to the automatic levers with which the tramway is furnished, very little labor is required in the entire operation, and brakings are reduced to a minimum. As a bucket enters

the upper terminal it is automatically detached from the traction rope and its momentum is overcome gradually when it is placed in the loading position. After it is loaded it receives an acceleration to overcome its inertia, and is then again attached to the line automatically and travels to the lower terminal. At this station the same operation occurs. In addition, however, the bucket is automatically dumped by means of a frame connected with the terminal shaft. As soon as the bucket enters this terminal, and before it is discharged, it is weighed automatically by a specially designed scale. The ore brought down in this tramway is of two classes, one which is loaded into the buckets in bulk, and the other of a higher class, which is loaded into the carriers in sacks.

Production of Coke in 1901.

The Year Broke All Records.

WASHINGTON, D. C., July 22, 1902.—The annual report of the United States Geological Survey on the production of coke in the United States in 1901, by Edward W. Parker of New York, has been completed, and shows that, including the output from 1165 retort or by-product ovens, the total quantity of coke amounted to 21,495,883 short tons, valued at $44,445,923, as compared with 20,533,348 short tons, valued at $47,443,331, in 1900 and 19,668,569 short tons, valued at $34,670,417, in 1899. The increase in production in 1901 as compared with the preceding year was 1,262,535 short tons, or 6.14 per cent., and was the largest output recorded in the history of the industry. The value of the product, however, showed a decrease of $2,997,408, or 6.3 per cent.

Causes of the Lower Value in 1901.

Notwithstanding the fact that the extraordinary demand for coke, which developed in 1899 and continued through 1900, was maintained throughout 1901, the average price per ton showed a decline from $2.31 in 1900 to $2.04 in 1901. This decline in price was a natural one, as during the spring of 1900 the prices were abnormally high and raised the average for that year to a figure nearly 15 per cent. higher than the average of any year since 1880. A decline in 1901 was to more normal figures, although the average for the year was higher than for 20 years, with the exception of 1900. Another cause of the decline in value in 1901 was the fact that the number of completed ovens increased from 58,484 in 1900 to 64,001 in 1901 and the producers were better able to supply the demand, and the increased facilities for transportation furnished by the railroads enabled them to market the product more rapidly. Connellsville coke may be taken as a basis for comparison. During 1901 Connellsville furnace coke ranged from $1.75 to $2.25, the lower figure being quoted in January and February and the higher price in December, with a general advancing tendency throughout the year. In 1900, on the other hand, Connellsville furnace coke, which opened at from $2.75 to $3.50 in January, advanced to as high as $4.25 in March and April, large sales being made at these high prices. Prices then steadily declined until December, when they were quoted at $1.75 to $2.

The value and the average price for coke are in many cases arbitrarily fixed, as a number of the larger manufacturers operate blast furnaces in connection with their coal mining and coke making business, in which cases the coke product is sometimes charged against the other departments at cost and sometimes at a figure based upon the cost of mining the coal and making the coke, with a percentage of profit on these operations. The value is not regulated according to the market price of the product at that time. In other cases, when no value of the coke is given by the operator, this has been estimated upon the values given by other operators producing practically the same grades of coke in the immediate vicinity.

Extent and Location of the Coke Industry.

At the close of 1900 there were 5804 new ovens in course of construction, of which 1096 were by-product ovens. Only 80 of the latter, however, were completed during 1901, and the increased production last year was almost entirely from beehive ovens. At the close of 1901 there were 5155 ovens in course of construction, of which 1533, or 30 per cent., were by-product ovens. The production of by-product coke increased from 1,075,727 short tons in 1900 to 1,179,900 short tons in 1901.

The number of coke making establishments as shown by the returns for 1900 was 396, which increased in 1901 to 423. In the latter year the number of establishments, the ovens in operation and the amount of coke produced, by States, are shown in the following table:

	Establishments.	Ovens built.	Coke produced. (Short tons.)
Alabama	31	7,136	2,148,911
Colorado	15	2,060	671,303
Georgia	2	510	54,550
Indian Territory	3	230	37,374
Kansas	12	98	7,138
Kentucky	5	461	100,285
Maryland	1	0	.....
Missouri	3	9	4,749
Montana	3	328	57,004
New Jersey	1	0	.....
New Mexico	2	126	41,643
Ohio	8	419	108,774
Pennsylvania	188	34,906	14,355,917
Tennessee	14	2,135	404,017
Utah	1	204	.....
Virginia	7	2,775	907,130
Washington	4	148	49,197
West Virginia	112	11,594	2,283,700
Illinois	3	154	.....
Indiana	1	54	.....
Massachusetts	1	400	.....
Michigan	2	30	564,191
New York	2	30	.....
Wisconsin	1	120	.....
Wyoming	1	74	.....
Totals	423	64,001	21,795,883

The States which showed the largest increases in production during 1901 were Pennsylvania, whose total increase was 998,622 short tons, and Virginia, whose output gained 221,974 short tons. Other increases in production were unimportant. There were five States in which decreases were shown, the principal losses being sustained by West Virginia and Tennessee, where the decreases were 74,799 and 71,415 short tons, respectively.

The Heavy Growth of Production.

It is interesting to note the increase in the number of establishments as compared with the increase in production. During the calendar year 1880 there were 186 coke making establishments in the United States, which produced a total of 3,338,300 short tons, an average of 17,948 tons for each establishment; in 1901 there were 423 establishments, which produced 21,795,883 short tons, an average of 51,527 short tons for each establishment, or nearly three times the average for each establishment in 1880. It should be stated, moreover, that the number of establishments in 1901 includes the 14 new establishments, having a total of 2185 ovens, which did not begin operations until after the close of the year. During this period the number of establishments has increased 127 per cent., while the production has increased over 550 per cent.

The table presented above shows that there were 64,001 ovens in existence at the close of 1901, but it does not mean that all of these were in active operation. Of the 423 establishments in existence on December 31 14 did not begin operations until 1902, and 53 establishments, having a total of 2605 ovens, were idle throughout 1901, leaving 356 establishments, with a total of 61,396 ovens, in active operation. It will be seen from this that practically all of the idle plants were of comparatively little importance, the 53 idle establishments having an average of 49 ovens each, while the 356 active ones averaged 173 ovens. There were only eight of the idle establishments in 1901 having more than 100 ovens to each.

In this connection it is also interesting to note the increase in the productive capacity of the coke ovens in the United States. It is not possible to compare the number of ovens in active operation each year and the averages must be based upon the number of ovens in existence on December 31. In 1880 the number of ovens in existence was 12,372. The total coke production was 3,338,300 short tons, an average of 278 short tons of

coke per oven. In 1890 the total number of ovens had increased to 37,158 and the coke production to 11,508,021 short tons, an average of 310 tons of coke per oven. In 1901 the number of active ovens was 61,396, which produced 21,795,883 short tons, an average of 355 tons per oven. The 1165 by-product ovens in operation in 1901 averaged 1013 tons of coke each.

Statistics of Production Since 1850.

The statistics compiled and published by the Geological Survey during the last 22 years are the only reliable record of coke production in the United States. The census of 1850 showed that there were four establishments making coke in the United States in that year; the following census, 1860, reported 21 ovens; in 1870 25 ovens were reported as in existence; but the statistics of production were not stated separately. In the calendar year 1880 the coke production of the United States amounted to 3,338,300 tons; in 1890, ten years later, it had increased to 11,508,021 tons; in 1900 it had grown to 20,533,348 tons, and in 1901 it reached the maximum production of 21,795,883 tons. This growth has been fairly regular. There were five years in the 22 in which the production was less than in the preceding year. The most noteworthy of these were the panic years of 1893 and 1894, when the production fell off from 12,010,829 short tons in 1892 to 9,477,580 in 1893 and to 9,203,932 in 1894. The industry recovered from this depression in 1895, during which year a production of 13,333,714 tons was obtained. This recovery was due to a short lived boom in the iron and steel trade in the spring of 1895. It was followed by another year of depression in 1896, since which time the production has increased without interruption.

Average Value of the Coke Produced.

While it is not practicable to present the actual value per ton of every grade of coke produced in the United States, an effort has been made by the Survey to present an average value for the principal States. For 1901 these figures were as follows: Alabama, $2.82; Colorado, $2.42; Georgia, $2.83; Indian Territory, $4.14; Kansas, $2.11; Kentucky, $2.07; Missouri, $2.09; Montana, $5.91; New Mexico, $2.84; Ohio, $2.75; Pennsylvania, $1.88; Tennessee, $2.35; Virginia, $1.63; Washington, $4.85; West Virginia, $1.80. The product of Illinois, Maryland, Massachusetts, Michigan, New York, Wisconsin and Wyoming has averaged $2.85. The average for the entire country was $2.039.

Average Amount of Coal Used Per Ton of Coke.

Some interesting figures presented in the report show the amount and value of coal used in the manufacture of coke per ton by States in 1901 as follows: Alabama, 1.79 tons of coal, valued at $2.028; Colorado, 1.71 tons, value $1.093; Georgia, 1.648 tons, value $0.989; Indian Territory, 2 tons, value $1.632; Kansas, 1.629 tons, value $1.482; Kentucky, 2.037 tons, value $0.894; Missouri, 1.90 tons, value $1.134; Montana, 1.806 tons, value $4.93; New Mexico, 1.737 tons, value $0.973; Pennsylvania, 1.514 tons, value $1.369; Tennessee, 1.83 tons, value $1.865; Virginia, 1.543 tons, value $1.006; Washington, 1.59 tons, value $2.94; West Virginia, 1.635 tons, value $1.203; other States, 1.406 tons, value $2.285; average of the United States, 1.57 tons, value $1.44.

Coke Making in By-Product Ovens.

In the report of the Survey on the production of coke in 1900 it was stated that the development of the coke manufacture in retort ovens for that year was noticeable rather for the number of new plants and ovens in course of construction at the close of the year than for any increase in production or in actual number of ovens completed. The same statement is true in regard to this branch of the coke making industry for last year. While there were 1096 by-product ovens building at the close of 1900, only 80 were added to the completed ovens during 1901, increasing the total number of completed ovens from 1085 to 1165. The production of by-product coke increased from 1,075,727 short tons in 1900 to 1,179,900 short tons in 1901. The number of by-product ovens in course of construction on December 31, 1901, was 1533, which included 1011 ovens reported as in course of construction at the close of the preceding year, a net increase of 522 new ovens begun in 1901 and not completed during that year.

The average production of the 1165 by-product ovens in 1901 was a little over 1000 tons per oven. The production of all the other ovens averaged about 343 tons per oven, indicating that the capacity of the retort ovens is about three times that of the beehive ovens.

History of By-Product Oven Construction.

The first plant of by-product ovens constructed in the United States was erected at Syracuse, N. Y., by the Semet-Solvay Company in 1893. It was an experimental plant of 12 ovens, operated in connection with the chemical works of the Solvay Process Company in that city. This plant has since been enlarged to a total of 30 ovens. The first Otto-Hoffman ovens were begun at Johnstown, Pa., in 1897 and completed in 1898. Sixty Newton-Chambers ovens were constructed at Latrobe, Pa., about the same time, but did not prove satisfactory. The plant was dismantled at Latrobe and another constructed at Pocahontas, Va., in 1900, where it has been operated with more success.

The number of completed by-product ovens in existence at the close of 1901 included 375 Semet-Solvay ovens, 730 Otto-Hoffman ovens and 60 Newton-Chambers ovens, which were distributed as follows:

Semet-Solvay Ovens.—Syracuse, N. Y., 30; Dunbar, Pa., 50; Sharon, Pa., 26; Ensley, Ala., 120; Benwood, W. Va., 120; Delray, Mich., 30. In addition to these there were building at the close of 1901 60 Semet-Solvay ovens at Dunbar, Pa.; 120 at Ensley, Ala., and 30 at Delray, Mich.

Otto-Hoffman Ovens.—Johnstown, Pa., 160; Glassport, near Pittsburgh, Pa., 120; Everett, near Boston, Mass., 400; Hamilton, Ohio, 50. In addition to these there were under construction at the end of 1901 232 Otto-Hoffman ovens for the Lackawanna Iron & Steel Company at Lebanon, Pa.; 564 for the same company at Buffalo, N. Y., and 100 for the South Jersey Gas, Electric & Traction Company at Camden, N. J.

Newton-Chambers Ovens.—Pocahontas, Va., 60.

Schniewind Ovens.—These are an improvement made by Dr. Fred. W. C. Schniewind on the Otto-Hoffman ovens. At the close of 1901 there were 200 of these under construction at Sparrows Point, Md., for the Maryland Steel Company; 212 at Sharon, Pa., for the Sharon Coke Company, and 15 at Wyandotte, Mich., for the Michigan Alkali Company.

Notes Regarding the Operation of By-Product Ovens

Of the 1165 by-product ovens in existence at the close of 1901 595, or a little more than half, were operated in connection with iron and steel plants. All of the Semet-Solvay ovens, with the exception of 30 at Syracuse, N. Y., and 30 at Delray, Mich., were operated in connection with iron and steel plants which consumed coke and surplus gas. The Otto-Hoffman ovens at Johnstown, Pa., are operated in connection with the Cambria Steel Company, who consume the coke and surplus gas. Those at Glassport, Pa., manufacture coke for domestic and metallurgical use, and dispose of the surplus gas to rolling mills in the vicinity. The plant at Everett, Mass., which up to the close of 1901 was the largest one constructed in the United States, manufactures coke for domestic, locomotive and factory use, and disposes of its surplus gas to the Boston gas companies. The plant at Hamilton, Ohio, completed during 1901, manufactures foundry and domestic coke and sells its surplus gas to the Hamilton Gas Company of that city.

Of the 1533 ovens in course of construction at the close of the year 1176 will be directly associated with blast furnaces or steel plants. The 60 new Semet-Solvay ovens under construction at Dunbar, Pa., will be operated, as the others at that place are, in connection with the Dunbar Furnace Company. The Tennessee Coal, Iron & Railroad Company will use the coke and surplus gas produced at the new Ensley plant of 120 ovens. The Lackawanna Iron & Steel Company, at their plants at Lebanon, Pa., and Buffalo, N. Y., will utilize the coke and gas produced by the Otto-Hoffman ovens building at those points, and the Maryland Steel Company at Sparrows Point will consume the coke and gas made at the Schniewind ovens now building there. W. L. C.

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A Judge's Plea for Compulsory Arbitration.

A notable contribution to the discussion of compulsory arbitration has been made by Judge Murray F. Tuley. The learned judge, who now enjoys the honor of being the longest in service of the occupants of the bench in Chicago, and has attained the eminence of Chief Justice of the Circuit Court of Cook County, was elected president of the Illinois Bar Association at the annual convention of that body, held in Chicago last week. This fresh distinction shows him to be highly esteemed by the members of the bar of Illinois and gives his opinions more than ordinary weight. He favored the convention with a paper on "Compulsory Arbitration—Is It Practicable or Advisable?" The extracts from his paper which have been published in the daily press also credit him with saying that he has made a thorough study of the labor question. Therefore it might reasonably be expected that he would make some practical suggestions along this line which would be accepted by all parties who are anxious to find some method of quickly ending disagreements between employers and employees. But in studying this question he seems to have become badly muddled. At first he appears to have been impressed with the belief that compulsory arbitration is out of the question.

"Experiments with laws for compulsory arbitration of labor disputes," he says, "have shown that they tend to destroy the manhood and individuality of employer and employee alike, and that they aid the growth of socialism. In New Zealand, where such a law has been tried, the officials have reported that petty grievances have been aggravated and great disputes multiplied. It is therefore my opinion from a thorough study of the situation that strikes and lockouts must continue until voluntary conciliation and arbitration are arrived at; until capital comes to recognize the rights of labor to a share of profits derived from their joint operation."

After paying a high tribute to organized labor, especially the heroism and devotion to principle of those who have a twelfth commandment, "Thou shalt not take thy brother's job," the judge alludes to the disastrous consequences which would follow the indefinite continuance of the anthracite miners' strike or of a strike of a similar important character. A strike is no longer a local matter, he says, for the great federation of laboring men, extending into every corner and industry of the country, has made it a national or even an international affair. In this connection he makes an attack on J. P. Morgan, picturing him as supercilious in his treatment of those who urged the arbitration of the anthracite miners' demands and stating the belief that he is "behind the coal barons in their inhuman declaration to the miners that there is 'nothing to arbitrate.'" After this display of his judicial temperament he works himself into a frame of mind which enables him to make the following deliverance:

> The larger the corporation the less it seems to be influenced by humanity. It is only a question of dividends; the smaller the wages the larger the dividends, and *vice versa*. The laborer seems to be considered merely a part of the machinery in the establishment.
>
> The nationalization of railroad, telegraph and telephone lines might do a great deal toward solving the problem. Shall these corporations and employers be placed under public control and restraint? Shall they be forced in some way to submit their disputes to the courts of justice as all other disputes are? I believe a solution lies in this line of action. The courts will eventually rise to the necessity of holding that legislation can be enacted to meet the conditions, and thus make the public welfare the supreme law.

If corporations and other employers should happen to "be forced in some way to submit their disputes to the courts of justice" and these disputes would be brought before such a judicial arbitrator as Judge Tuley here shows himself to be, it would be easy to guess the character of the decisions made. Compulsory arbitration needs better advocates to make it popular.

American Workshop Methods in Steel Construction.

A great deal of literature is now appearing from the pens of foreigners who have been visiting this country for the purpose of investigating the difference between American methods and those pursued in their own countries. Our columns have contained much information derived from these sources which has been extremely interesting to our readers. A fresh contribution on this subject has come to hand in the form of a paper on "American Workshop Methods in Steel Construction," by Henry Bridges Molesworth, a member of the Institution of Civil Engineers, London. The paper was submitted at a meeting of the institution in January last and has just been issued in pamphlet form, together with a discussion by the members. The paper deals with the author's observations at the Pencoyd Works of the American Bridge Company, at which he spent about three months, looking after the construction of 26 viaducts for the Uganda Railroad. It will therefore be seen that he had sufficient time for studying the practice in these works to enable him to form a very correct judgment relative to the value of the processes employed. He did not simply pay a short visit and make hasty generalizations. The description of the works which he gives is quite exhaustive, taking up the features of the plant in detail. Our space will only enable us to refer to a few of the points which were brought out.

In the introductory paragraphs he controverts the British impression that American bridge work is necessarily of the "cheap and nasty" class. His experience of first-class American bridge work is that it is fully equal, if not superior, to the best English work in design, material, workmanship and finish. This is very important, in view of the fact that contracts for structural work have been awarded to American manufacturers at prices lower than those tendered by English firms, and therefore the inference has been drawn that the work must have been of an inferior character. He finds that while the cost of labor is greater in the United States than in England, the output of the individual workman and the hours which he may work are not limited by the labor organizations to the same degree as in England. He states, for example, that in America one man will handle a plate, say, 10 feet by 6 feet by ⅝ inch under a punch, working entirely without assistance, while in England he would have two to four men around him. And the American will get the holes punched in his plate just as quickly and as accurately as will the three to five men in England. In evidence of the large amount of work done by American workmen a table is submitted which shows the output per man per annum in the bridge department of the Pen-

coyd Works, in gross tons. The output per man is arrived at by dividing the total output of the works, or of a department, as the case may be, by the number of men employed. The average of seven years at the Pencoyd Works gives the output of the draftsmen at 771 tons; templet makers, 2366 tons; bridge shop men, 115 tons; forge men, 45 tons, and eye bar shop men, 185 tons. Mr. Molesworth states that the amount of work annually done in England by draftsmen is about 1000 tons, the templet makers about 500 tons, the men in the bridge shop 20 to 30 tons, and in other departments about one-fifth as much as in America. While draftsmen turn out a little more in England than in America, more work is put into the drawings in this country. A table, for instance, is given on each drawing, showing the sizes of all material required, and this table goes into the works with the drawing, enabling the workman to pick out his material from the list, thus involving much less possibility of error and no delay. This comparison goes far to explain the low prices at which American bridge works have been tendering abroad.

The description given of workshop methods at Pencoyd deals with many items which are common to American structural shops, but the comparisons made with the usual practice in England are generally to the disadvantage of the latter. The care taken to secure accuracy in American works is extolled, as in England it will happen, as for instance in the case of punching, that the accuracy depends entirely on the skill of the puncher. The extensive use of goose necks and rollers, by which a man can easily handle a plate of any size, is brought out. The excellent condition in which the blades of shears are kept excites favorable comment. Mr. Molesworth states that, except by examining the cut surface, it is impossible to tell the difference between a cut made by one of these machines and a cut made by a cold saw. He dwells on the fact that rivets are hardly ever put in by hand, but are driven either by hydraulic or pneumatic machines. He alludes to the extensive use of universal plates, which are furnished by the plate mills to any width specified by fractions of an inch up to 48 inches and which leave comparatively little planing to be done. The facilities for handling beams or other large pieces by cranes and the expertness of the crane men excite his admiration. He states that the advantage of being able to turn out small portions of the work, such as stiffeners, web covers, angle cleats, &c., in large quantities, through the designing of work so that as many small parts as possible are interchangeable, is enormous as compared with marking each piece and shearing and punching it to those marks. Attention is also called to the fact that the accuracy of the work renders erection at the bridge works unnecessary and therefore this is never required or done, except very occasionally, as when specified in the case of European orders. He summarizes the following as the causes which enable the American manufacturer to work so cheaply:

1. The workmen, while more highly paid than English workmen, also turn out a much larger quantity of work.

2. The arrangement of the works is more carefully thought out and labor saving appliances are more used.

3. There is more method and probably more scientific knowledge in the drawing office.

4. The works run night and day.

5. The templet making is reduced to a minimum by care in the drawing office and by the use of automatic machinery and stops and guides.

6. Obsolete machinery is turned out of the works as soon as it is superseded by anything better.

7. All tools are kept in a state of perfect efficiency.

8. Railroad freights are much lower than in England.

The length of the discussion brought out by the paper demonstrated the interest which it excited. It was agreed that the paper was a valuable contribution to the discussion on foreign competition with England's manufacturing interests, but several of those who contributed their opinions and judgment were not inclined to give as much weight to the various statements brought forth by Mr. Molesworth as they seemed to deserve. Criticisms were made of numerous details, especially by engineers, who admitted that they had not been in the United States and were not aware of the exact character of the work done. These criticisms, however, frequently referred to minor points, showing more of a tendency to quibble than to seriously consider the points brought out by the paper as a whole. On the other hand, in a few instances the statements made by Mr. Molesworth were confirmed by other engineers, and the admission was made that English bridge builders could profit a great deal by adopting more of the methods prevailing in America. Frequent reference was made during the course of the discussion to the trades unions in Great Britain as constituting a menace to the prosperity of the country in the future. It was stated that no body of men lost more time than the members of the Boiler Makers' Society, who are the bridge makers in Great Britain. A number of them made a practice of losing the first quarter of the day on Monday and one or more quarters during the week, and it had now become a custom to convert every bank holiday into a three or four days' holiday. Great loss is entailed by this waste of time to a firm having heavy fixed charges to be earned before profit could be made. Mr. Molesworth's recommendations were appreciated as to labor saving machines and the abandonment of obsolete machinery, but it was feared that the drastic measures taken in America would be impossible in Great Britain. Mr. Molesworth participated in the discussion and maintained the position taken in his paper with great ability.

No General Strike of Coal Miners.

The decision of the convention of United Mine Workers at Indianapolis last week not to declare a general strike of coal miners relieves the business situation considerably. Although it may be the general belief that such a strike would not have continued for any great length of time, as available strike funds would have soon been exhausted by the heavy drain on them, yet the suspension of all coal mining for even a week or two would have seriously dislocated the business of the country and caused enormous losses. Happily, we are spared this affliction, and have but the minor problem, which is nevertheless an important one, of the duration of the anthracite miners' strike. This has now been running over ten weeks, and seems likely to continue considerably longer, especially if the operators are not inclined to depart from their policy of waiting for the miners to starve themselves into defeat. The United Mine Workers have pledged such financial assistance to the anthracite miners that if all union miners who are now working pay their assessments the funds thus secured will encourage the anthracite miners to hold out. A strong appeal has also been addressed to the public by the miners' convention in the hope that substantial contributions can be secured from those who sympathize with the strikers. But assessments are always hard to collect, and it will be very remarkable if the appeal to the public results in a response which will be deemed even fairly satisfactory by its authors. The amount re-

quired to sustain the striking miners is so vast that it will not be surprising if the funds forthcoming from the working miners and the public should prove so seriously inadequate as to discourage persistence in striking. In that event the end would not be far off.

The Treasury Bureau of Statistics has just issued a most important statement relative to the growth of our trade with the Hawaiian Islands, Porto Rico, the Philippine Islands and Alaska, which are designated as "the noncontinguous territory of the United States." They now furnish a market for $50,000,000 worth of the products of the people of this country, the exports during the fiscal year ending June 30 having reached that total, exclusive of shipments made by the Government for the use of troops or other representatives. This total is made up as follows: Hawaiian Islands, $20,000,000; Alaska, $15,000,000; Porto Rico, $10,000,000; Philippine Islands, $5,000,000. The exports to these territories in the past fiscal year are practically five times as large as in 1897, when none of them, excepting Alaska, was under the American flag. The increase in the imports from these territories was not so great as in exports to them, having a little more than doubled. The details are given as follows for the fiscal year 1902: Hawaiian Islands, $23,000,000; Alaska, including gold and silver, $15,000,000; Porto Rico, $8,000,000; Philippine Islands, $7,000,000, or a total of $53,000,000, as compared with about $25,000,000 in 1897. These figures constitute a strong argument for those who believe that trade follows the flag.

New Methods of Hardening Steel.

The *Montan und Metallindustrie Zeitung*, a German metallurgical journal, has recently published a report on a new process for hardening steel which is attracting the attention of German iron and steel manufacturers. The inventor is a blacksmith named Knigge, whose residence is at Homburg on the Rhine. The inventor claims that the new process is much cheaper than the one employed at present at the Krupp works at Essen, also a great deal more efficient. A projectile hardened by Knigge's process will, according to the inventor, go through a Krupp armor plate, while it will be impossible for a projectile hardened by the Krupp process to penetrate an armor plate hardened by Mr. Knigge. The process can be applied to steel articles of any kind. It is said that a number of pieces of steel sent to Mr. Knigge by outside manufacturers, and returned to them after having been hardened by the new method, have given entire satisfaction. An offer made by an English syndicate to buy the process has been declined, as Mr. Knigge has built a plant of his own at Ruhrort, the necessary funds having been furnished by a local capitalist. Application has been made at the Patent Office at Berlin for a patent. It remains to be seen whether the new invention is really as important as is claimed at present. Various processes of hardening have been invented which seemed to work satisfactorily when experimented with in a small way but failed to fulfill expectations when given a practical test on an extensive scale.

A report on another new method of hardening steel, invented in Germany, was recently published in the Frankfurter *Journal*. It states that the technical high school in Charlottenburg has just completed a series of experiments with a new hardening process brought out by an inventor named Giebeler. He is a small manufacturer in Mecklenburg, who has for years been working on his process, but was unwilling to bring it before the public until it had been thoroughly tested by experts. The results reached at the technical high school are stated to have been most satisfactory. It is claimed that by the Giebeler process all sorts of steel can be given strength and hardness double that obtained by the Harvey, Krupp and Boehler processes, in spite of the fact that the cost of production is reduced 50 per cent. Projectiles fired against a 7¾ mm. (0.305 inch) sheet of steel hardened by the Giebeler process penetrated only to the depth of 1 mm. (0.039 inch), while a similar sheet of Krupp steel was completely penetrated with Giebeler hardened sword blades. Other sword blades can be shivered as if they were made of wood.

Advance in Shafting.

At the meeting of the Shafting Association of the United States, recently held at Lake George, N. Y., prices of shafting were not only advanced to 47 per cent. off for carloads and 42 off for less than carloads, but an advance in extras charged for centering shafts and for key seating was also made. The new price-list for key seating is as follows:

			Middle splines.			
Diameter of shaft.	Full length. Per foot.	For couplings. Per end. Milled ends.	First foot or less. Milled ends.	Second foot and over. Per foot.	Extra for each drilled end.	Extra for each squared end.
1 to 1⅛ inches	$0.16	$0.24	$0.50	$0.16	$0.20	$0.30
1 3-16 to 1⅜ inches	.20	.30	.60	.20	.30	.40
1 7-16 to 1¾ inches	.24	.40	.70	.24	.40	.50
1 13-16 to 2⅛ inches	.30	.50	.80	.30	.50	.60
2 3-16 to 2⅜ inches	.40	.60	.90	.40	.60	.70
2 13-16 to 3⅜ inches	.50	.80	1.10	.50	.70	.80
3 7-16 to 3⅞ inches	.60	1.00	1.30	.60	.80	1.00
3 15-16 to 4¼ inches	.70	1.20	1.50	.70	.90	1.20
4 5-16 to 4⅝ inches	.90	1.40	1.70	.90	1.00	1.30
4 13-16 to 5¼ inches	1.20	1.70	2.20	1.20	1.10	1.50
5 5-16 to 5¾ inches	1.50	2.00	2.50	1.50	1.30	1.70
5 13-16 to 6 inches	2.00	2.50	3.00	2.00	1.50	2.00

Intermediate sizes, same price.

The prices adopted for centering shafts are as follows, taking effect July 9, 1902:

New Prices Adopted by Shafting Manufacturers.

		Per pound.
½ to ¾ inch, Rd.	6 to 12 inches long	2½c.
	12⅛ to 24 inches long	1½c.
	24⅛ inches and longer	1 c.
13-16 to 1¼ inches, Rd.	6 to 12 inches long	1½c.
	12⅛ to 24 inches long	1 c.
	24⅛ inches and longer	¾c.
1 5-16 to 2¼ inches, Rd.	6 to 12 inches long	1 c.
	12⅛ to 24 inches long	¾c.
	24⅛ inches and longer	½c.
2 5-16 to 4 inches, Rd.	6 to 12 inches long	¾c.
	12⅛ to 24 inches	½c.
	24⅛ inches and longer	3-10c.
4 1-16 to 6 inches, Rd.	6 to 12 inches long	½c.
	12⅛ to 24 inches long	3-10c.
	24⅛ inches and longer	1-10c.

The discounts for centering shafts and for key seating are the same as on shafting—that is, 47 per cent. off in carloads, and 42 off in less than carloads—delivered in base territory. The next meeting of the Shafting Association will be held in the Waldorf-Astoria, New York City, on Wednesday, October 8, 1902.

The Reese-Hammond Fire Brick Company.

The Reese-Hammond Fire Brick Company of Bolivar, Pa., with works at that city, Fairmont and Curwensville, have secured the contract for the large new blast furnace and four hot blast stoves being erected by Julian Kennedy for the Rochester & Pittsburgh Coal & Iron Company, at Du Bois, Pa. They recently furnished the brick for a blast furnace for one of the United States Steel Corporation's plants and within four months have secured orders for six blast furnaces and eight Kennedy hot blast stoves. They were also awarded the contract recently by the Union Steel Company for brick for their new open hearth plant and other furnace work being erected at Donora, Pa., amounting to about 7,000,000 high grade fire brick. The company own a large acreage of the purest and most refractory clays in Clearfield County, and have under lease some of the most desirable territory in that county. They are increasing the capacity of their Curwensville works to 75,000 high grade fire brick per day, building several miles of mine railway and making other extensive improvements.

They have almost completed their new No. 1 works at Bolivar, which replaces the old one destroyed by fire in March. The new plant is a brick structure 60 x 312 feet, two stories high, strictly modern in all its equip-

ments, and will have a capacity of 30,000 brick per day. It is to be used for the manufacture of high grade refractories exclusively. The company have won every important contract for high grade material for which they have contested this year, which is indeed a phenomenal record. The total capacity of their seven plants, including all classes of high grade refractories and other clay products, reaches 285,000 brick per day, making the Reese-Hammond Company several times the largest independent fire brick manufacturers in the United States with a well established reputation of 35 years' successful experience.

General Trade Conditions in Scotland.

Strength of the Pig Iron Market.

GLASGOW, July 9, 1902.—The remarkable strength exhibited by the pig iron market is not due to speculation, but to legitimate trade influences. There are, no doubt, a few unfortunate short sellers of warrants who have not yet been able to cover their sales, but the bulls are merciful and by no means disposed to stampede the market. The growth of the American demand and the probability of that demand still further increasing are sustaining the warrant market, but at the same time the home demand is so good that smelters have no time to accumulate stocks and are sending their output into production almost as fast as they can turn it out. It is true that more Cleveland iron has been and is being sent into the warrant stores at Middlesbro, but this is explainable by the desires of short sellers of warrants to obtain cover. Practically the movement in the iron ring nowadays is in Cleveland warrants, which are now 5 shillings 6 pence under Scotch, thus affording a rather better, though still slight, margin for shipments from Cleveland to Scotland. While I write there are under 150,000 tons in the Cleveland warrant yard and 50,000 tons in the Scotch warrant yard. At the end of June there were in normal circulation warrants for 50,000 tons Scotch (since reduced) and 144,000 tons Cleveland. A few quotations may at this juncture be of special interest to your readers. While I write Scotch G. M. B. warrants are 56 shillings 6 pence; Cleveland ordinary warrants, 51 shillings, and Cumberland hematite warrants, 60 shillings 3 pence. Hematite is now in better demand, and 57 shillings 6 pence is the quotation for Middlesbro and 61 shillings 6 pence to 62 shillings (delivered) for Scotch qualities. No. 1 Cleveland is 53 shillings; No. 3, 51 shillings; No. 4, 50 shillings 3 pence, and gray forge, 49 shillings 6 pence. Scotch makers' prices are: Coltness No. 1, 70 shillings; No. 3, 58 shillings 6 pence; Gartsherrie No. 1, 67 shillings 6 pence; No. 3, 58 shillings 6 pence; Eglinton No. 1, 58 shillings 6 pence; No. 3, 54 shillings 6 pence; Glengarnock No. 1, 67 shillings 6 pence; No. 3, 58 shillings 6 pence; Carron No. 1, 67 shillings 6 pence; No. 3, 58 shillings 6 pence. The imports of Cleveland iron into Scotland are now at the rate of 5000 to 10,000 tons per week, and the total for the year so far is about 55,000 tons ahead of the corresponding portion of last year. The audit for wages purposes shows that the net average price of Cleveland No. 3 in June quarter was 45 shillings 8.31 pence per ton, or 1 shilling 8.18 pence more than in the previous quarter. The blast furnace men are obtaining an advance of 2 per cent. in wages, after previous successive reductions amounting in the aggregate to 30 per cent.

Export Sales.

Several sales of Scotch pig iron for shipment to America are reported. One lot of 4000 to 5000 tons is said to be awaiting special charter, but most of the iron is now going across by the liners, which are booked for as much as they can carry for several weeks ahead. An order for 3000 tons of steel billets was reported a few days ago, but a good many more orders have been received which have not been reported. A cargo of 4000 tons of Cleveland foundry iron is being shipped from the Tees to Philadelphia at 7 shillings freight. An order for 5000 tons of Cumberland hematite, Millom brand, is being shipped direct from Maryport to the United States, at a low freight, and it is said that more is being negotiated. There are 85 furnaces in blast in Scotland, as compared with 76 a year ago; but it is probable that some may be damped down next week for the annual holidays. As the iron and steel works usually close for a week or ten days in July makers then seize the opportunity to overhaul furnaces.

Our total exports of pig iron in June were only 73,674 tons, as compared with 84,980 tons, notwithstanding the abnormal shipments to America. The decrease is due to the great falling off in the German demand.

The following shows the allocation of June shipments as compared with last year:

To—	1901. Tons.	1902. Tons.
Russia	2,155	1,253
Sweden	4,388	893
Norway	1,645	558
Denmark	1,765	1,046
Germany	22,988	9,274
Holland	12,066	5,459
Belgium	4,674	3,598
France	7,587	2,243
Portugal	980	1,500
Italy	9,157	8,582
Japan	2,160	810
United States	6,497	26,319
Australia	2,105	1,494
New Zealand	264	170
Canada	1,186	5,605
Other countries	5,363	4,870

The quantities entered against Holland and Belgium are practically all in transit from Germany. Note the increase of 20,000 tons in the shipments to the United States and of 4000 tons in the shipments to Canada. The July figures will bulk much larger if all the orders received can be freighted. *Per contra*, our imports of pig iron have been larger, as follows:

From—	1901. Tons.	1902. Tons.
Sweden	5,963	7,883
United States	346	829
Canada, Germany, &c	713	9,937
Totals	7,022	18,149

In the six months ending with June we imported nearly twice as much as last year, as shown below:

From—	1901. Tons.	1902. Tons.
Sweden	23,988	24,096
United States	27,167	6,786
Canada, Germany, &c	9,052	85,881
Totals	60,207	116,713

And in the six months we imported 3,056,517 tons of iron ore (all save 508,000 tons from Spain), as compared with 2,569,364 tons in the first half of last year.

To come back to the exports. Our total for the six months has been 377,589 tons, as compared with 447,486 tons last year, and the proportion to the United States was 81,903, as compared with 20,107 tons—a fourfold increase. Canada got 12,110 tons, as compared with 2377 tons. On the other hand, the quantity sent to Germany direct has dwindled to 55,411 tons, as compared with 119,960 tons in the first half of 1901 and with 236,940 tons in the first half of 1900. The quantities sent via Holland were only 30,999 tons this year, as against 71,602 tons last year, and via Belgium 22,443 tons, as against 33,443 tons. But pig iron is not all that the United States has been buying from us of late, and in the following table I sum up all our shipments of iron and steel to your country in the six months ending with June:

	1901. Tons.	1902. Tons.
Pig iron	20,101	81,903
Bars, angles, rods	3,681	2,330
Railroad iron	20	5,198
Iron and steel wire	1,769	2,287
Tin plates and sheets	24,283	37,740
Unenumerated iron	1,039	1,627
Old iron	101	4,185
Unwrought steel	5,132	20,209
Manufactured steel	115	110
Black plates	233	99
Totals	56,444	155,688

We do not seem to have sent you any galvanized sheets, our exports of which in the last six months have been 160,520 tons, as compared with 121,731 tons in the first half of last year. The value is about £2,000,000, in increase about £500,000 on last year. The increase has occurred principally in the supplies to South Africa.

British India, Australia and New Zealand. Canada has also taken a good deal more from us, as well as of bars and angles, railroad iron, sheets and plates, tin plates, iron manufactures, old iron for remanufacture, unwrought steel (20,282 tons, as against 3824 tons), &c. Altogether we have sent 30,000 tons more of crude steel in the six months than in the corresponding six months.

Shipping Statistics.

Our exports of new ships in June were 24,777 tons, of the declared value of £389,927, and in the six months were 158,120 tons, of the declared value of £3,053,256. But these records are very unsatisfactory, as they do not reveal the character of the vessels nor their destinations. The total of the six months included six war ships, valued at £588,000. The shipbuilding industry is better employed than one expected to find it in midsummer. During June the Scotch yards put out 26 vessels, aggregating 47,896 tons, which, though 10,000 tons short of the May output, brings up the six months' total to 259,804 tons, which beats the record of any previous June half year. The highest previous total for the first half was 256,310 tons in 1899. If, as is assumed, we began the year with orders for 400,000 tons on hand, the whole may be cleared before the end of the third quarter. But during the last three months quite a number of large contracts have been booked, besides the 45,000 tons of war ships for the Admiralty, and it is estimated that Scotch shipbuilders have quite as much work before them as they had at the beginning of the year. Still it must be confessed that there are not so many men in employment as a year ago and that shipbuilding material, after a period of firmness, is showing some signs of weakening. The comparatively low prices at which good merchant steamers can now be built will almost certainly attract orders, notwithstanding the continued depression in the freight market; but one knows by experience that there is not very much contracting done by shipbuilders in the hight of summer. From August to October is usually the season at which most business is done in that way. In other parts of the country the shipbuilders have not been so well employed as here, for the output of the whole of the United Kingdom for the six months is 668,000 tons, as compared with 700,000 tons in the first half of 1901.

The Coal Trade.

In a previous letter I mentioned the arrangements that have been made for the adjustment of wages in the Scotch coal trade by means of a reconstructed Conciliation Board, whose operations, however, are restricted within a fixed minimum and maximum rate. The coal owners applied to have the wage reduced to the minimum (which is 5 shillings 6 pence per day), on account of the low average realized price of the last few months. The representatives of the men challenged the figures and called for an audit by an accountant of their own. Between the two reports the joint board has been unable to agree, and had to call in a neutral chairman, Sheriff Jameson, to decide whether a reduction is due, and if so when it should take effect. Pending the award the trade has been rather unsettled, although no real difficulty is anticipated. There is a decided slackness in the matter of new export business, yet the shipments from the Scotch ports continue ahead of last year, a fact which is rather surprising in the circumstances. The shipments are larger, the output is smaller (for many of the collieries are unable to keep running the whole week), yet there is an enormous supply and prices are from 1 to 2 shillings per ton under last year. The entire shipments of coal from the United Kingdom in June were 3,720,583 tons, as compared with 3,714,134 tons in June, 1901, an increase of 0.2 per cent.; but the declared value, owing to the decline in prices, was only £2,284,742, as against £2,592,254, a decrease of nearly 12 per cent. There seems little doubt that with the reduced prices and high working costs many of our coal owners are scarcely able to make ends meet now, after their burst of prosperity, and that if they do not get some relief either in costs or prices several of the badly situated pits will have to close down. Meanwhile trouble seems pending in the Welsh coal trade, where the men are rejecting the old sliding scale and insisting upon one with a minimum regulated by a joint board, which the coal masters are unwilling to concede. B. T.

World's Fair Power Plant at St. Louis.

Work has begun on the foundations for a tower to carry the electric wires in the Palace of Machinery, where the great power plant is to be situated. The big switchboard will be placed high on the western end of the Machinery Palace, accessible only from the special gallery. The tower, whose foundations are well below the surface of the ground, will connect the switchboard gallery with the electrical subway, which is 7 x 7 feet and 1 mile long. From this subway the service conduits lead out in all directions to all buildings and all parts of the grounds where electricity is to be used either for power or lighting. Over 100 miles of wooden conduits have been bought for this purpose. The foundation for the tower will be concrete, and the walls will be lined with fire proof tile.

The power plant in the western end of the Machinery Palace will develop by means of four immense Westinghouse steam driven generators 8000 kw., the equivalent of 10,720 horse-power. The Exposition has also arranged to buy 7500 kw., or 10,050 horse-power, from the Citizens' Light & Power Company, making a total of 20,770 horse-power. Two thousand horse-power will be developed from exhibit plants in the Machinery Palace, which will be used by the Exposition for a variety of purposes. All power used by the Exposition will be controlled from the one great switchboard. Such an unusual volume of power is necessary because of the great number of moving exhibits in many of the buildings and the extensive electric lighting and cascade schemes. The intra-mural railroad, several miles in length, will also require a large volume. The boiler house will be situated 150 feet west of the Machinery Palace, and will contain a battery of boilers of unusual size and steam capacity.

Coaling at Sea.

A description of the Lidgerwood-Miller marine cable way as installed on the United States battle ship "Illinois" by the Lidgerwood Mfg. Company, 96 Liberty street, New York, has been received. This vessel is now fully equipped with apparatus for taking coal at sea, and every part of the installation has been thoroughly tested and accepted by the Navy Department. The original marine cable way was installed on the collier "Marcellus," and upon its fifth trial it delivered to the battle ship "Massachusetts" in a sea a little heavier than moderate over 20 tons of coal per hour. The towing speed was from 5 to 6 knots. The second cable way was placed upon the British collier "Muriel." It has delivered from 35 to 40 tons per hour in a moderate sea and a half gale of wind to the "Trafalgar."

The only machines required for a marine cable way are two special operating winches, but these have been so designed that they serve a double purpose. In harbor coaling "nigger" heads are used, and they will hoist a gross ton 300 feet per minute. The slipping drum will develop a rope speed of about 1700 feet a minute and lift a load of ½ ton. These winches operate the load carriage between the collier to the war ship. One winch draws the loaded carriage toward the war ship, while the other draws the empty carriage back to the collier. A single wire rope ⅝ inch in diameter and 2000 feet long is employed for this purpose. Both winches run all the time in the same direction and the ropes are always tight. The reciprocating motion is given to the load carriage by the friction of one slipping drum overpowering the other. The drum of one winch is always winding in rope. The drum of the other is always paying out rope under tension by the slipping of the friction heads. This method of operating a load carriage is independent of the relative motion of the two ships. When the ships pull apart one drum slips, thus paying out the rope. When the ships approach each other the slack given to the rope is wound in. It is essential, of course, that the rope speed of these winches be greater

than the speed at which the ships approach each other. In indorsing this plan Admiral Dewey said: "By your plan of having the war ship carry the machinery to operate the conveyor system coal could be taken from any captured vessel or from any other floating source of supply."

OBITUARY.

GEORGE STEPHENS.

George Stephens, president of the Moline Plow Company, Moline, Ill., died on Saturday, July 12, in his eighty-third year. He was born in Ligonier Township, Westmoreland County, Pa., on February 22, 1819. He was a great-grandson of Capt. Alexander Stephens, who came to this country from Wales in 1746 and for faithful services to his adopted country was presented with a tract of land in Pennsylvania, which, after six generations, is still in the family. The father of Mr. Stephens was a soldier in the war of 1812. George Stephens first visited Moline in 1841 and two years later, being a millwright, he erected a saw mill 30 miles from the city. In 1844 he became associated in the purchase of a saw mill on Government land opposite the city. In 1864 the Government asserted its claim to the island upon which the mill was located, and with the money derived from its sale Mr. Stephens purchased an interest in 1866 in Candee, Swan & Co., manufacturers of farm implements. Messrs. Candee and Swan of the firm subsequently sold their interests to S. W. Wheelock. In 1870 the Moline Plow Company were incorporated with a capital of $250,000, with Mr. Wheelock as president and Mr. Stephens vice-president. Mr. Stephens subsequently became the controlling owner of the company. In 1885 Mr. Stephens retired from active management of the business, but continued his interest, visitng the plant twice daily, even up to last April, when sickness compelled him to abandon his daily trips. Mr. Stephens was married in 1846 to Miss Mary A. Gardner, who died some years ago. Two sons and four daughters survive him. Under the management of Mr. Stephens the business of the Moline Plow Company attained great growth. To-day the capital stock of the company is $2,400,000 and they employ 1200 men, with an annual capacity of 200,000 plows, besides other farm implements.

FRANK A. BANCROFT.

Frank A. Bancroft was born July 7, 1871, at Woburn, Mass., and died July 11, 1902, at Asheville, N. C., after an illness of two years. He graduated from grade schools of his native city and finished his education at the University of Wisconsin. About his first business experience was in the employment of D. M. Sabin, in connection with the latter's enterprises located at Stillwater, Minn. Mr. Bancroft's complete knowledge of Sabin's affairs caused him to be selected assistant to the receiver, and he had much to do with the building and equipment of the Wisconsin & Michigan Railroad. At the same time he had charge of the furnace at Spring Valley, and in all of these positions he demonstrated his fitness to manage large interests. In 1895 he became connected with Casey & Day, Chicago, and had entire charge of their selling arrangements, which he handled with great ability. In 1897 he formed a connection with the National Tin Plate Company, with whom he remained until they were absorbed by the American Tin Plate Company. While this was a severe blow to his ambition he did not lose courage, but immediately formed a partnership with T. S. Casey under the firm name of Casey & Bancroft, Chicago, representing the Riverside Iron Works of Wheeling, W. Va. With every assurance of a prosperous future his expectations were not to be realized, and for the second time within a year he found his business absorbed by a consolidation. He was then elected secretary of the Northwestern Expanded Metal Company of Chicago, which office he held at the time of his death. In 1900 he married Miss Elizabeth Neff, who survives him.

NOTES.

VAN BUREN DENSLOW died at his residence in New York City on the 17th inst. of apoplexy. He was born in Yonkers, N. Y., in 1833, and, although bred to the law, devoted most of his life to literary pursuits. During the period when the tariff was an absorbing topic of discussion Dr. Denslow espoused the side of protection, wielding an influential pen. He was formerly the editor-in-chief of the Chicago *Tribune* (1863) and of the Chicago *Republic* (1866), and afterward he was a member of the staff of the New York *Tribune* (1868). In 1869 he returned to Chicago and resumed his position on the *Tribune* of that city. He then became the head of the Union College of Law, attached to the Northwestern University and the University of Chicago. In 1880 Professor Denslow renewed his connection with the press as one of the staff of the Chicago *Inter-Ocean*. Dr. Denslow's principal work as an author was "The Principles of Economic Philosophy," an elaborate treatise of 800 pages. He was also the author of "Modern Thinkers."

C. A. ROSECRANZ, secretary and treasurer of the Allerton-Clarke Company, Chicago, Ill., died suddenly in that city, July 18, aged about 46 years. Mr. Rosecranz, who was well and favorably known in the trade, had been with the Allerton-Clarke Company since 1892, he previously having been identified with the hardware house of Cutter, Woodward & Co., Chicago. Before that he was employed by the Yale & Towne Mfg. Company when they first opened a Chicago branch. He is survived by a widow and one son.

ALBERT E. SHORTHILL, head of the A. E. Shorthill Company, iron founders, of Marshalltown, Iowa, died on July 6 at his home in that city.

Bids for Manhattan-Brooklyn Tunnel.

Last Monday the Rapid Transit Commission of New York opened bids for the construction of a tunnel from near the City Hall, New York, to the Battery and under the East River to Brooklyn. This is practically an extension of the subway now being built in Manhattan. The Rapid Transit Construction Company, headed by August Belmont and John B. McDonald, presented two propositions. The first offered to build the tunnel for $2,000,000, or with all terminals for $3,000,000. The second bid proposed to construct the tunnel for $4,000,000, and, if this bid should be accepted, they offer to construct for the nominal sum of $100,000 a subway under Broadway from Union Square to Forty-second street.

The Rapid Transit Company of Brooklyn bid $8,000,000.

The Rapid Transit Construction Company now have the contract for the present subway work, and the new work would form an extension to that system. This company will control the present subway for 50 years and the extension for 35 years.

The New Steel & Iron Company, recently incorporated with a capital stock of $100,000, have taken over Hackettstown Furnace, at Hackettstown, N. J., formerly operated by the Carteret Steel Company, and will operate it for the production of steel by a secret process, the invention of Henry A. Jones. Mr. Jones advises us that experiments made by him have so far proved a success and at a cost in the plant of less than half the present cost of the usual method for the same given output on equally as large a commercial scale. The press reports that Senator Jones of Nevada is associated with Henry A. Jones in the project are incorrect. Experiments along the same line, which have been carried on by Senator Jones with others for some time, are understood to have been a complete failure. The officers of the New Iron & Steel Company are John McLaren, president; I. H. Radford, vice-president; John B. Wood, secretary and treasurer, and Charles J. Luther, manager.

G. L. Colburn, well known to the steel trade of New England, has associated himself with Fitz, Dana & Co., iron and steel merchants, 110 North street, Boston, and is traveling in their interest.

MANUFACTURING.

Iron and Steel.

Definite steps have been taken by the United Steel Company of Canton, Ohio, for the construction of a new plant there to supply independent sheet steel manufacturers with billets and sheet bars. Interested in the venture are a number of Pittsburgh capitalists, and the plant is to be the basis for as rapid increase in productive capacity as business warrants. The contracts for the building of the plant have been awarded to the Fort Pitt Bridge Company, and the first buildings will be of steel frame with corrugated steel sheathing. The plans for the building were prepared by Victor Buetner, mechanical engineer, of Pittsburgh. The main building will contain two open hearth furnaces of 35 tons capacity. It will be 100 x 500 feet. There will be a blooming mill, soaking pits, universal plane mill, roller tables, shears, &c., and the main structure will be fitted with three electric traveling cranes and an independent electric power plant. The cost of the first buildings will be $300,000. They will be built so that additions can be made when necessary.

The south mill of the Republic Iron & Steel Company at Terre Haute, Ind., resumed operations on July 21. The machinery has been overhauled and six new boilers installed.

Increased business has compelled the Sheffield Car Company of Three Rivers, Mich., to build an addition, 60 x 100 feet, to their plant, to supply much needed room for the manufacture of steel wheels. The wheels are rolled from steel plates, and, it is claimed, make the lightest and most durable wheel for light car purposes.

The Griffin Mfg. Company, Erie, Pa., are installing a cold rolling department to finish steel for their own use in the manufacture of new lines of hardware they are bringing out, and are increasing their power plant.

The Lukens Iron & Steel Company, Coatesville, Pa., advise us that they expect to erect blast furnaces on the property they recently purchased, but it will be some time before the matter will be definitely settled. The stockholders of the company have taken out a West Virginia charter for a company, to be known as the Lukens Coal Company. Having purchased considerable acreage of gas coal property near Clarksburg, they will open a mine, equipping it with all necessary modern pneumatic machinery for mining upon the most improved methods, capable of mining about 1000 tons per day.

Franklin Furnace, at Franklin Springs, N. Y., was blown in July 23. The furnace is operated by the Franklin Iron Mfg. Company, owners of the furnace and ore mines at Clinton, both of which have been put into first-class condition. The stack is 70 x 15 feet, and has an annual capacity of about 30,000 tons of foundry iron. J. B. Walker is manager.

Hecla Furnace, at Ironton, Ohio, blew in July 7.

The strike at the blast furnace of the Lawrence Furnace Company, Ironton, Ohio, has been settled and operations have been resumed.

The Pittsburgh Steel Foundry of Pittsburgh, with works at Glassport, Pa., are at present casting basic and acid open hearth ingots for rolling mills whose rolling capacity is larger than their melting capacity. A number of such orders have been secured and prompt delivery can be made on additional quantities.

The Weimar Machine Works Company of Lebanon, Pa., are at present building the following liquid cinder cars of 200 cubic feet capacity of their patent, which refers to the carrying out of the ladle while it is being poured: Lackawanna Steel Company, Buffalo, N. Y., 10 cars, steam dumping device; Colorado Fuel & Iron Company, Pueblo, Col., 20 cars, hand dumping device; Crucible Steel Company of America, Pittsburgh, Pa., 6 cars, hand dumping device: Copper Queen Consolidated Mining Company, Butte, Mont., 7 cars, attached electric motor device; Carnegie Steel Company, Braddock, Pa., 10 cars, hand dumping device, and cars with hand dumping device for Lake Superior Power Company, Sault Ste. Marie, Can., and National Tube Company, at Wheeling, W. Va. The company have the contract for the furnace tops for the Penn Iron & Coal Company, Canal Dover, Ohio, and for Joseph Wharton's No. 3 furnace at Port Oram, N. J. The tops were designed by Frank C. Roberts & Co. of Philadelphia.

The Board of Trade of Newark, Ohio, are reported to have completed negotiations with C. A. Taylor of Cambridge to establish in Newark a steel rolling mill employing 300 men.

The Belfont Iron Works Company of Ironton, Ohio, declared a 10 per cent. dividend at the recent annual meeting. A similar dividend was declared in January. The directors elected were B. H. Barr, Robert Peebles, S. T. Gilfillan, S. B. Steece, John Peebles, H. C. Barr and Thomas Parker. The old officers were re-elected.

The United Engineering & Foundry Company of Pittsburgh have made a number of improvements and additions to equipment at the plant of the Lloyd-Booth department, Youngstown, Ohio. A 15-ton Shaw electric traveling crane has been installed, with a span of 40 feet and a reach of 126 feet. A 15-ton air furnace and two new drying ovens have also been installed.

The Dewey Iron & Steel Company of Pittsburgh have been granted a charter. The new concern will erect a plant in that city.

At Canton, Ohio, the plant of the Carnahan Tin Plate Company is in full operation. The sheet mill of the Stark Rolling Mill Company has been idle for a couple of weeks undergoing repairs. The Canton Works of the American Sheet Steel Company has been idle for some time, and there are no immediate prospects of resumption at this plant.

The Wheeling Steel & Iron Company, Wheeling, W. Va., are installing three new gas producers for supplying the heating furnaces at the tube mill at Benwood. Work on the new tube mill of this concern is not progressing as fast as desired, owing to delay in securing material.

Twelve mills at the Greer Works and 20 mills at the Shenango Works of the American Tin Plate Company, New Castle, Pa., have been started up.

A number of capitalists of Canonsburg, Pa., have purchased the tin plate plant at that place, formerly operated by the American Tin Plate Company, for the reported price of $125,000. It is said the new concern will very much enlarge the plant, adding new buildings, new mills and other equipment. John F. Budke, formerly connected with the Canonsburg Iron & Steel Company, is actively identified with the new concern.

General Machinery.

The William Tod Company, engineers, founders and machinists, Youngstown, Ohio, have placed contracts for three large cranes, which will be delivered within the next three months and will be installed in the new additions which the William Tod Company are making to their extensive plant. These cranes are of 70-foot span and 60 tons capacity, and will be built by the Browning Engineering Company, Cleveland, Ohio. The cranes are arranged to have a capacity of 40 tons at 12 feet per minute and 60 tons at 8 feet per minute. A crane of 10 tons capacity is also being built for the William Tod Company by the Youngstown Engineering Company, which will be erected in the new machine shop. It will have a 45-foot lift and a 45-foot span. A 5-ton crane will be furnished by the Whiting Foundry & Equipment Company of Harvey, Ill. It has a 35-foot span and a 25-foot lift. The crane will be erected in the new forge shop. The William Tod Company have further placed a contract with the Pond Machine Tool Company for a planer 14 feet wide and 12 feet high, and which will weigh 130 tons. They have also placed contracts for other heavy iron working tools which they will install in the large additions they are building to their machine shops.

The Christiana Machine Company, Christiana, Pa., manufacturers of turbine wheels, shafting, pulleys, &c., have incorporated under the same name. The business will be continued under the same management and along the same lines as heretofore. They advise us that it is probable that they will add considerably to their plant in the near future.

The American Excelsior & Machine Company, 508 Union Trust Building, Baltimore, Md., have incorporated with a capital stock of $100,000, for the building of an improved excelsior machine, under patents of James R. Bate, which they will put out on royalties. The company will also operate one or more plants for the manufacture of excelsior. The officers are: President, Jules W. Leroux, founder and former president of the Structural Iron & Steel Company of Baltimore; vice-president and general manager, James R. Bate, president of the Baltimore Mahogany Company, and secretary and treasurer, J. Milton Lyall.

The Delaware & Hudson Company advise us that they will enlarge their shops at Oneonta, N. Y., plans for which are under way.

The E. D. Jones' Sons Company, Pittsfield, Mass., have purchased the building, 50 x 75 feet, adjoining their machine shop, which will be used as an extension to their plant.

The C. O. Bartlett & Snow Company, Cleveland, Ohio, are installing a coal dryer for the McCormick Harvesting Machine Company of Chicago, Ill., who will first dry and then grind the coal and use it in that form in their annealing ovens. The C. O. Bartlett & Snow Company are also furnishing a dryer to the Indianapolis Water Company, Indianapolis, Ind., for the same purpose, to be used in the water works boiler in place of natural gas. The company claim that there is quite a saving in this process.

There has been a change in the management of the Fitchburg Machine Works, Fitchburg, Mass., J. L. Chapman having been retired and Frank B. Manville elected manager. Mr. Manville is one of the Waterbury, Conn., family of that name and is well known in the machine tool field. It is intimated that there will be a change in the policy of the concern and that more attention will be given to the production of their regular line and less to special work.

The annual meeting of the stockholders of the Youngstown Foundry & Machine Company, Youngstown, Ohio, builders of rolls and rolling mill machinery, was held last week. Thomas Parrock was elected president; W. J. Wallis, vice-president, and Frank A. Williams, secretary and treasurer. The report of operations of this concern for the past year was very satisfactory to the stockholders. During the year extensive improvements were made by this concern to their plant, and it is the intention to make still further improvements by which their capacity will be very much increased.

Jones & Laughlins, Limited, of Pittsburgh, are continually making additions to their electrical equipment and have recently ordered from the Westinghouse Electric & Mfg. Company one 800-kw. direct connected generator, two 150 kw. motor driven two-phase alternators, and two 125-light motor driven arc generators. The Westinghouse Electric & Mfg. Company have also received an order from the Doylestown Electric Company of Doylestown, Pa., for two 100-kw. engine type two-phase alternators with direct connected exciters, complete with switchboard, and one from the Standard Steel Car Company of Pittsburgh for their plant at Butler, Pa., for two 375-kw. (A. C.) generators, one 400-kw. direct connected generator, a 300-kw. rotary convertor for use as a connecting link between the two, and about 50 induction motors, which will be used largely for direct connection to machine tools.

The Ironsides Company, Columbus, Ohio, report a substantial increase of business during their late fiscal year recently ended, with encouraging prospects for continued growth in the current year. Their manufactures comprise special lubricants for ropes, gears and machinery, and specially adapted for heavy rolling mill and other general gearing.

E. F. Wittler has purchased an interest in the Corbin Machinery Company, Seattle, Wash. The company have been reorganized under the name of the Wittler-Corbin Machinery Company and the capital increased to $40,000.

The James H. Perkins Mfg. Company, Seattle, Wash., have let the contract for construction of their large plant for the manufacture of saw and shingle mill machinery and for cutting, bending and fitting pipe of all kinds. There will be a main manufacturing building, 60 x 120 feet, with an L 22 x 26 feet, which will be used as the power house, and another building of the same dimensions with attached offices, 26 x 30 feet, which will be used for storage and the pipe cutting department. The plant will be of brick and stone, with truss roof, and will be equipped throughout with all the latest appliances.

The directors of the Shelby Stove Company of Shelby, Ohio, have voted not to accept other propositions, but continue in Shelby and increase the capacity of their plant by installing new machinery.

The Canton-Akron Railway Company, Canton, Ohio, S. J. Rounds, general manager, are building a large power house, a portion of which will be used as repair shops for the electric railway system recently consolidated. Considerable new machinery will be purchased.

The Webster, Camp & Lane Company, Akron, Ohio, are building a large hoisting and conveying outfit for the Hendrie & Bolthoff Mining Company, Anaconda, Col. Last week they shipped a crank shaft weighing 17½ tons, a part of the installation. The company are rapidly completing their immense new plant at South Akron.

The Pittsburgh & Conneaut Dock Company, Conneaut, Ohio, will enlarge their present shop and install an electric light and cable plant.

The Goodyear Tire & Rubber Company, Akron, Ohio, will break ground about August 1 on a four-story addition, 100 x 300 feet. A portion of the building will be used as a machine shop.

The Sterling Electric Company of Warren, Ohio, have increased their capital stock from $50,000 to $100,000, and are breaking ground for a large new factory building, in which they will manufacture incandescent lamps and electrical specialties.

Westinghouse, Church, Kerr & Co., New York, have recently booked the following foreign orders for Westinghouse products through their several foreign representatives: Indwe Railway, Coal & Land Company, Cape Colony, South Africa, a complete railway system for operation in the De Beers Mines, Cape Colony, the equipment comprising two 250 horse-power compound single acting engines direct connected to Westinghouse generators, for furnishing current to Baldwin-Westinghouse mining locomotives, of which there will be six; Juan Martinez, Linares, Spain, one 125 horse-power three-cylinder gas engine operating on producer gas, and belted to two 37½ k.w. Westinghouse generators for power purposes; Montezuma Lead Company, Santa Barbara, Mexico, one 75 horse-power compound engine; the Osaka Club Hotel, Tokio, Japan, a complete electric service for lighting and power, including one 25 horse-power standard engine direct connected to generator; Graham Brothers, Stockholm, Sweden, two 200 horse-power compound engines for power purposes; Takata & Co., Tokio, Japan, one 150 horse-power compound engine; the De Beers Consolidated Mines Company, Limited, Cape Colony, two 1000 k.w. turbo generators, to be delivered the first part of the coming year; Coatzacoalcos Light & Power Company, Coatzacoalcos, Mexico, complete air pump and condenser outfit, in connection with their power plant. The steam loop and holly gravity return system has had many new applications abroad, prominent among which are the works of La Gran Fundicion Central Mexicana, Aguas, Calienta, Mexico, and the large works of the British Westinghouse Electric & Mfg. Company, Manchester, England. At these works will be installed several 132 x 22 grate Roney stokers, and at the power plant of the Mersey Railway seven 158 x 28 and two 136 x 24 grate Roney stokers.

It is stated that the coinage machinery in the Philippines is old and useless, and it has been decided to install new machinery, orders for which will probably be placed shortly.

The Chapman Valve Mfg. Company, Indian Orchard, Mass., will remodel their large machine shop, building a second-story addition to the structure, 50 x 244 feet. Considerable new machinery, including an electric traveling crane, will be installed. All equipment has been purchased.

William Ward, formerly in the sales department of the Brown & Zortman Machinery Company, Pittsburgh, has opened an office in the House Building in that city for the purpose of dealing in new and second-hand machine tools.

The Stanyon Engineering Company, Empire Building, Pittsburgh, have received a contract for the coal handling equipment to be installed at the plant of the Columbia Plate Glass Company, Blairsville, Pa. The equipment consists of crushers, elevators, conveyors and a 450-ton storage bin. The company were also awarded the contract for the car haul and coal tipple equipment to be installed for the Dunkirk Coal Company, near Monongahela City, Pa.

Boilers, Engines, &c.

H. C. Hubbell & Co., Somerset, Ky., propose to build a new power plant to cost about $12,000.

James E. McNary, Empire Building, Pittsburgh, has been awarded a contract to furnish a 600 horse-power Hamilton heavy duty rolling engine, manufactured by Hooven, Owens & Rentschler Company, Hamilton, Ohio, and three 200 horse-power Franklin water tube boilers, made by the Franklin Boiler Works Company, Troy, N. Y., for the new plant of the Franklin Rolling Mill & Foundry Company at Franklin, Pa.

Citizens of Millersburg, Ohio, are negotiating for the erection in that city of a hot water heating and electric lighting plant.

Citizens of New Bremen, Ohio, have voted to issue $50,000 bonds to secure a municipal water works and electric light'ng plant.

Director Immel of the Board of Public Works, Columbus, Ohio, has ordered the city clerk to advertise for bids for the building and equipping of a municipal electric lighting plant after plans recently accepted.

Contracts have been awarded for the new plant of the Pittsburgh Valve & Fittings Company, at Barberton, Ohio, and work of excavating has been started. The plant will be a very large one.

The Columbus Edison Electric Company, Columbus, Ohio, have purchased a site adjoining their present power house and will erect a large addition.

Drake, Wilson & Williams, boiler makers, Omaha, Neb., have been succeeded by the Wilson Steam Boiler Company, recently incorporated with a paid up capital of $25,000. The company are erecting a new brick shop, 50 x 125 feet, which will be equipped with improved tools operated by electric motors. The officers are J. M. Wilson, president, and J. Morris Wilson, secretary and treasurer.

Contracts have been awarded for a steam heating plant and an electric lighting outfit for the State Asylum for the Blind at Columbus, Ohio. Hoffman & Conklin Company secured the former contract on a bid of $14,428, and J. A. Erner & Co., Cleveland, Ohio, the latter contract on a bid of $12,190.

The Lagonda Mfg. Company of Springfield, Ohio, have been incorporated for the purpose of manufacturing boiler tube cleaners, engine machinery, tools, supplies and steam specialties. Capital stock, $10,000. Incorporators, H. C. Wineland, J. W. Gunn, C. Pence and Baldwin McGraw.

The Allis-Chalmers Company, Chicago, have received an order from the Kioto Traction Company, Kioto, Japan, for a 16 and 32 x 36, 1890 frame cross compound direct coupled Reynolds-Corliss Engine, and one from the London United Tramways, London, England, for a 26 and 54 x 48 vertical cross compound direct coupled Reynolds-Corliss engine, second order. Other sales in June include, Kennedy Mining & Milling Company, California, one direct acting double drum hoisting engine, with drums 10 x 7 feet, driven by 28 x 60 duplex Corliss engine; Pennsylvania Railroad Company, at Pittsburgh, one Riedler air compressor with air cylinders 15 and 24 x 36 inches, driven by cross compound noncondensing Corliss engine with steam cylinders 14 and 24 x 36 inches; Twin City Rapid Transit Company, Minneapolis, Minn., 46 and 94 x 60 vertical cross compound direct coupled Reynolds-Corliss engine, third order; John Q. Grant, Elon College, N. C., 18 x 48 Reynolds-Corliss engine; Russell, Birdsall & Ward Bolt & Nut Company, Port Chester, N. Y., 22 x 48, 1890 frame, Reynolds-Corliss engine; West Allis Malleable Iron & Chain Belt Company, West Allis, Wis., 12 x 30 girder frame Reynolds-Corliss engine; one 28 x 48, one 20 x 48, one 18 x 36, one 16 x 36, one 12 x 36, one 10 x 30, 1890 frame, Reynolds-Corliss engine, and one 20 x 42, one 16 x 42, two 14 x 36 girder frame, Reynolds-Corliss engines, to parties throughout the country.

Fires.

The shipbuilding plant of the Palmer Iron & Shipbuilding Company, at Jarrow, England, was damaged $200,000 by fire July 22.

The Ridgeland power house of the Consolidated Traction Company of Chicago was partially destroyed by fire July 16. The loss is about $100,000.

The plant of the United States Silica Company, at Morristown, N. J., was destroyed by fire July 19. The loss is estimated at about $10,000.

The brass foundry of the Charles Parker Company's plant, Meriden, Conn., was recently destroyed by fire. The loss will reach $5000.

The John A. Roebling Sons Company suffered a $100,000 loss by fire at their plant in Trenton, N. J. The principal loss was in the braiding shop, which contained a large amount of machinery.

Foundries.

The Michigan Malleable Iron Works of Detroit, Mich., have made plans to increase their facilities by the addition of three new foundries, ground for which has been broken on the company's property at Delray. The new foundries will increase the capacity to over 200 tons per day, and will cost about $100,000.

At several of the foundries of Minneapolis the coremakers struck last week, and some of the floor molders have been temporarily laid off on account of the strike because of lack of work. No serious interruption to business is anticipated, however, as the places of some of the strikers already have been filled. Some of the foundries have settled with their men, while others are still holding out against the demands of the union. Among the foundries interested are the Diamond Works and the Western Foundry.

The Bryigon Foundry, Reading, Pa., who have been in operation only 15 months, have outgrown their present quarters and will erect a larger and very complete steel casting plant, using the Bookwalter steel process, license for which they have been granted. The firm, composed of Andrew Bryson, Henry R. McElligott and Selden S. Deemer, will shortly incorporate.

The Chantrell Tool Company, Reading, Pa., have completed their new foundry and are making 10 tons of fine light gray iron castings a day.

The Youngstown Steel Casting Company, at Youngstown, Ohio, started up their furnace last week, and are now turning out steel castings.

Hardware.

Dodge & Zulli, Syracuse, N. Y., manufacturers of the Syracuse Easy Washing machine, recently shipped a carload of their washers to Seattle, Wash. They have also received an order for 84 machines to be shipped to Scotland. Their business has gradually grown until they have been obliged to increase their manufacturing facilities.

The John Dunlap Company of Pittsburgh, manufacturers of tin ware, have commenced work on a new plant at Carnegie, near Pittsburgh. There will be two main buildings of brick and steel construction, one measuring 70 x 250 feet and the other 40 x 250 feet.

Miscellaneous.

Detroit Copper & Brass Rolling Mills state that they expect to erect and operate a tube plant at Detroit.

American Tank & Fixture Company, Chicago, have changed their name to the Acorn Brass Mfg. Company and increased their capital from $50,000 to $200,000.

The Phillips Pressed Steel Company of Joliet, Ill., recently organized with a capital of $25,000, purpose to erect a plant which they will equip with specially designed machinery for the manufacture of pressed steel casks and barrels, under patents of John E. Phillips. The casks and barrels are both light and durable and have received much favorable comment in business and manufacturing circles.

The Galion Wagon Gear Company, Galion, Ohio, will rebuild their plant, recently destroyed by fire. No machinery will be purchased at present.

The American Can Company, New York, deny the report that they intend to erect a tin plate plant at Chicago. The company will, however, make a number of improvements to their plants in that city.

M. M. Carr and Philip Peter, doing business at Fostoria, Ohio, as the United States Railway Signal Company, have suffered a second loss by fire within two weeks. The plant was almost entirely destroyed. They have decided to build a new brick and steel plant at once, and will increase their facilities for manufacturing railway torpedoes.

The Edgar S. Low Company, Empire Building, Pittsburgh, dealers in contractors' and railway supplies, have decided to erect a car and railroad supply plant at Everson, Pa. Three buildings will be erected, each about 100 feet long and 60 feet wide.

The Wilkes Wood Pattern Company of Toledo, Ohio, are erecting a new plant, 35 x 60 feet, which they expect to have ready shortly after August 1. The company will make patterns.

The Pioneer Stove Company of Columbus, Ohio, have let contracts for a three-story office and warehouse building, 180 x 200 feet, immediately west of the power house of the Columbus Railway Company. Other buildings will be erected here later.

Architect Frank L. Packard, Columbus, Ohio, has completed plans for the plant to be erected for the Hayden-Corbett Chain Company, that city, previous mention of which has been made in these columns.

The American Shipbuilding Company of Cleveland have closed a contract for another large steel steamer. It was ordered by C. W. Elphicke of Chicago. She will have a capacity of 5200 tons, and will be 376 feet over all, with 366-foot keel, 50-foot beam and 28 feet deep. She will have triple expansion engines with cylinders 20, 33½ and 55 inches, with 40-inch stroke, and will have two Scotch boilers 12½ feet in diameter and 11 feet in length, fitted with Howden forced draft. The boat will be called the "Watson," after G. Watson French, vice-president of the Republic Iron & Steel Company. This makes 23 vessels which the Cleveland Company have under contract for next season. Twenty are freight steamers, one is a car ferry and two passenger steamers.

The General Engineering & Construction Company of Akron, Ohio, have been organized to manufacture electrically driven tram cars for industrial equipments.

PERSONAL.

A. Trinler has resigned his position as superintendent of the plant of the National Steel Works, at Sharon, Pa., and has been succeeded by William Stoups, who has been connected latterly with the Mesta Machine Company at West Homestead, Pa. Mr. Stoups was formerly master mechanic of the Sharon plant of the National Steel Company. It is understood that Mr. Trinler will be given the charge of another plant of the United States Steel Corporation.

T. J. Farrell, the London manager of the American Steel & Wire Company, sails from Liverpool for New York on July 23. He will remain in the United States until August 27, returning to London on that date by the "Oceanic."

J. Stanley James, engineer of the Caucasus Copper Company of Southern Russia, is visiting the United States for the purpose of purchasing the equipment for a water power plant for operating the mines.

George D. Wick, president of the Youngstown Iron, Sheet & Tube Company, at Youngstown, Ohio, who sailed for Europe several months ago, left his resignation with the company before he went away. It has been accepted, and the stockholders will meet in Youngstown this week to appoint his successor. James A. Campbell, now general manager, has been proposed for the position of president and may be elected. It is said that the report of operations of this concern for the fiscal year ending June 30, and which will be submitted to the stockholders at the meeting this week, will make a very satisfactory showing.

At Pittsburgh, F. E. Now, formerly purchasing agent of the Cleveland, Lorain & Wheeling Railroad, has been appointed purchasing agent of the Pittsburgh Coal Company to succeed W. A. Dinker, resigned. F. H. Stark, formerly general car foreman of the Baltimore & Ohio Railroad, at Baltimore, has been appointed superintendent of motive power of the Pittsburgh Coal Company.

Albert L. Schultz, formerly of the Schultz Bridge & Iron Company, and later of the American Bridge Company, has opened an office in the Frick Building, Pittsburgh, as consulting engineer.

R. D. Kuhn, for many years manager of the Park Steel Company, at Cleveland and Chicago, has been appointed special agent of the Crucible Steel Company of America, with headquarters in the Frick Building, Pittsburgh.

The Inland Steel Company, Marquette Building, Chicago, who have just completed a steel plant at Indiana Harbor, Ind., are soliciting orders for the second half of this year on the following material: Open hearth billets, 4 x 4 inches and larger; open hearth slabs; open hearth sheet and tin plate bars; open hearth squares, 1½ to 4 inches; open hearth rounds, 1½ to 6 inches (for shafting); open hearth flats, 4 to 16 inches wide; open hearth angles, 3 to 6 inches; open hearth channels, 6 to 12 inches; open hearth I-beams, 6 to 12 inches; open hearth plow beam billets, and open hearth plates and sheets, ¾ inch to No. 30.

The Iron and Metal Trades.

The pressure for Steel Billets has abated, and importers are now inclined to the opinion that the buying of foreign Billets is at an end. This view of the situation is confirmed by offers made the past week of considerable quantities of foreign Billets for resale. The Billet situation, while thus shown to be easier, has not led to any special weakness in prices. Some contracts have already been made for deliveries extending into next year on the basis of current prices.

Foundry Pig Iron presents some very interesting features. The supply has been curtailed by the stoppage of numerous Eastern furnaces for lack of fuel, and by the banking of several in the Central West also unable to secure enough coke to keep them running. The shortage in Pig Iron is particularly bad in the East, and numerous foundries are seriously suffering. The furnaces in the anthracite regions are not only producing little Iron, but their product is quite frequently off grade, which will not meet contract requirements. This is causing an increasing quantity of foreign Foundry Iron to be used. Shipments are coming in very freely from abroad. The fear that the shortage in Foundry Pig Iron may be felt for a long time to come is shown by inquiries now being made for prices on English Pig Iron for deliveries running well into next year.

The Southern furnace companies decided last week to establish $17, Birmingham, for No. 2 Foundry as the basis for contracts for deliveries in the first six months of next year. They have since booked a heavy tonnage for that delivery, mainly from Western consumers. The West is feeling particularly cheerful over the prospects of business for next year, due to the promising condition of agricultural interests. It can be stated on excellent authority that the manufacturers of harvesting machines are enjoying an unprecedented demand, which they believe will completely clean up their stocks of machines by the close of the selling season. The implement manufacturers are prominent among those who are purchasing Foundry Pig Iron for next year's delivery. Chicago reports sales of Foundry Pig Iron the last week aggregating about 160,000 tons, part Northern and part Southern.

The Rail tonnage for next year continues to pile up. Additional orders have been placed during the week, and the contracts booked for 1903 are now considerably above 1,000,000 tons, exclusive of the business taken by the Colorado mill. Inquiries covering large lots are still in hand, some roads asking for a much larger quantity than they have ever before purchased at one time. This shows that the heavy orders have by no means been exhausted. The purchasing power of the railroads and their disposition to continue to make improvements are shown by the fact that heavy orders are coming up for bridge work for next year. The Burlington is stated to be in the market for 50,000 tons. The Atchison road a short time since placed an order for between 50,000 and 60,000 tons. It is necessary now to place orders for next year's delivery by those who desire Structural Material if they wish to make themselves certain of securing it. Foreign business in Beams is increasing, and it is expected that importations will grow larger for some time instead of smaller.

Spelter has advanced sharply, while other metals show but little change.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one month and one year previous.

	July 23, 1902.	July 16, 1902.	June 25, 1902.	July 24, 1901.
PIG IRON:				
Foundry Pig No. 2, Standard, Philadelphia	**$22.50**	$22.50	$22.00	$14.75
Foundry Pig No. 2, Southern, Cincinnati	*20.75*	20.75	21.25	12.75
Foundry Pig No. 2, Local, Chicago	21.50	21.50	21.50	15.00
Bessemer Pig, Pittsburgh	**21.75**	21.75	21.50	16.00
Gray Forge, Pittsburgh	**21.00**	21.00	20.50	13.50
Lake Superior Charcoal, Chicago	**25.00**	25.00	24.00	17.00
BILLETS, RAILS, ETC.:				
Steel Billets, Pittsburgh	*32.00*	31.50	32.50	24.00
Steel Billets, Philadelphia	29.50	29.50	29.50	26.50
Steel Billets, Chicago	31.00	31.25	....	....
Wire Rods, Pittsburgh	*36.00*	36.00	37.00	36.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00
Spikes, Tidewater	2.00	2.00	2.00	1.80
Splice Bars, Tidewater	1.90	1.90	1.90	1.50
OLD MATERIAL:				
O. Steel Rails, Chicago	18.50	18.50	18.50	13.00
O. Steel Rails, Philadelphia	**21.25**	21.00	21.00	15.75
O. Iron Rails, Chicago	**24.50**	24.00	24.00	18.50
O. Iron Rails, Philadelphia	24.50	24.50	24.50	19.50
O. Car Wheels, Chicago	21.00	21.00	21.00	16.50
O. Car Wheels, Philadelphia	**20.50**	20.50	20.00	17.50
Heavy Steel Scrap, Chicago	*19.00*	19.00	20.00	12.50
FINISHED IRON AND STEEL:				
Refined Iron Bars, Philadelphia	1.95	1.95	1.95	1.55
Common Iron Bars, Chicago	1.80	1.75	1.80	1.55
Common Iron Bars, Pittsburgh	1.80	1.80	1.80	1.45
Steel Bars, Tidewater	**2.00**	2.00	1.90	1.60
Steel Bars, Pittsburgh	1.60	1.60	1.60	...
Tank Plates, Tidewater	2.00	2.00	2.00	1.75
Tank Plates, Pittsburgh	1.75	1.75	1.75	1.60
Beams, Tidewater	**2.25**	2.35	2.10	1.75
Beams, Pittsburg	**2.00**	2.00	*1.60	1.60
Angles, Tidewater	**2.25**	2.35	2.00	1.75
Angles, Pittsburgh	**2.00**	2.00	*1.60	1.60
Skelp, Grooved Iron, Pittsburgh	2.12½	2.15	2.15	1.85
Skelp, Sheared Iron, Pittsburgh	*2.15*	2.20	2.25	1.90
Sheets, No. 27, Pittsburgh	2.90	2.90	2.90	3.20
Barb Wire, f.o.b. Pittsburgh	2.90	2.90	2.90	2.90
Wire Nails, f.o.b. Pittsburgh	2.05	2.05	2.05	2.30
Cut Nails, Mill	2.05	2.05	2.05	2.00
METALS:				
Copper, New York	*11.87½*	11.95	12.00	17.00
Spelter, St. Louis	**5.10**	5.00	4.70	3.80
Lead, New York	4.10	4.10	4.10	4.37½
Lead, St. Louis	3.97½	3.97½	3.97½	4.27½
Tin, New York	**28.25**	28.80	28.25	27.25
Antimony, Hallett, New York	8.25	8.25	8.37½	8.75
Nickel, New York	50.00	50.00	50.00	60.00
Tin Plate, Domestic, Bessemer, 100 pounds, New York	4.19	4.19	4.19	4.19

*Official quotations.

Chicago.

FISHER BUILDING, July 23, 1902.—(*By Telegraph.*)

Heavy sales of Pig Iron and liberal contracts for bridge Structural Material for 1903 have been the prominent features of the week. Including the smaller sales for nearby delivery, the contracts placed for Pig Iron have been but little under 160,000 tons, about 90,000 tons being Northern Iron and 70,000 tons Southern brands. It is significant that while Northern Iron has been taken in very large amounts by single purchasers, the buying of Southern Iron has been in relatively smaller amounts, ranging from 1000 to 7000 tons each, indicating a more general demand, and this is borne out by the fact that jobbing foundries have found it advantageous to cover some of their wants for next year, as well as Implement manufacturers, Pipe works, car works and Stove foundries. The Bar Iron market has continued somewhat unsettled, with prices irregular, ranging all the way from 1.75c. to 1.95c., but there is a more determined effort to secure more remunerative prices, and the indications point to a higher level of the market in the near future, as some of the most important mills are refusing to accept orders except at higher prices. Sales of Structural Material for the week will aggregate about 20,000 tons. Cast Iron Pipe has again been advanced in sympathy with Pig Iron. The demand for Rails has continued active and large contracts are reported to have been turned to the East, as local mills have temporarily suspended the sale of large

quantities. Only about 8000 tons have been booked here during the past week, but over 50,000 tons are reported to have been placed in the Pittsburgh district. One interesting feature of the situation is the purchase of Scrap in Europe for Bar Iron mills in the central West. Shipments are being made via New Orleans and the Mississippi River. These transactions have resulted from the scarcity and high prices prevailing for domestic Scrap. Hoops, Galvanized and Light Sheets are the only Steel products which are slow. Chicago dealers report the sale of 3000 tons of Muck Bar at $36.50 per ton, Pittsburgh.

Pig Iron.—Heavy sales of both Northern and Southern Iron have been made during the week for delivery during the first half of 1903. In the aggregate about 157,000 tons have been sold, 90,000 of which has been Northern Iron, the balance Southern Iron, almost entirely of Foundry grades and mainly of Nos. 1 and 2. Of the Northern Iron about 50,000 tons were Malleable, but besides Malleable foundries, car works, Stove foundries, Agricultural Implement manufacturers and Pipe works have been among the large buyers. In addition machinery manufacturers, jobbing foundries and special industries have been in the market. The Northern Foundry Iron has been sold mainly on the basis of $21, Chicago, for No. 2, and the Southern Iron mainly on the basis of $17 for No. 2, Birmingham, but about 7000 tons were sold at $16.50, Birmingham basis. At the meeting of the Southern furnaces, held in New York City during the week, the various companies represented agreed to maintain the $17 basis for next year's delivery, and the furnaces which had been previously selling at $16.50 have advanced to $17, making a more uniform and firmer market. It is reported that the Southern railroads have agreed to advance freight rates from the South to the Ohio River 50c. per ton, beginning January 1, 1903. It is thought that Northern roads will make no advance. Up to the present time, however, it has been the disposition of the trade to allow 20c. per ton advance from the Ohio River north—that is, for figuring contracts for next year's delivery. In addition to the 50,000 tons of Malleable Iron, Northern Iron has been sold in lots of 30,000, 5000, 2000 and 1000 tons. Southern Iron has been sold in one lot of 10,000, two lots of 5000, one lot of 6500, one of 2500, one of 3000, one of 2000 and eight lots of 1000 tons each. In addition to the above sales made in the local market 25,000 tons of Southern Foundry are reported to have been sold at St. Louis, in which local parties are said to have been interested. Spot Iron and Iron for immediate shipment is very difficult to obtain, but there have been sales of No. 1 Southern Coke in single carloads and one lot of 50 and one of 100 tons at $25.65, delivered, and No. 2 Southern Coke at $24.65 to $25.15, and No. 3 ditto from $24.65 to $25, delivered, Chicago. Small lots of White Iron have been offered and sold at $22.15, delivered. One of the large Southern interests which sold very heavily for this year and will be obliged to carry over 1902 contracts for the first two months of 1903 have returned to the market offering and selling Iron beginning with March to July, and from now on will be a more important factor in the market. There have been sales of 1200 tons of irregular mixed lots of Foundry grades at about $24, delivered. The settlement of the labor difficulties in the Birmingham district has been followed by a more confident feeling, but there seems little prospect of improvement in the Kanawha, New River and Pocahontas districts; yet operators are reported to have decided to make an attempt to resume mining in the Kanawha district on July 28. At the close one Southern furnace is reported to have sold its entire capacity up to July, 1903, and other Southern furnaces are demanding all the way from $17 to $18 for No. 2 for next year's delivery. Spot Iron is even more irregular. In some cases Nos. 2 and 3 bring almost the same prices. Charcoal Iron is especially scarce and Southern brands have been advanced $2 per ton. While the following quotations are relatively those current for delivery during the current year, they are little better than nominal, and future quotations will be based upon sales made for next year's delivery, with premiums given on delivery during the current year and on cash transactions:

Lake Superior Charcoal	$25.00 to $26.00
Local Coke Foundry, No. 1	22.00 to 22.50
Local Coke Foundry, No. 2	21.50 to 22.00
Local Coke Foundry, No. 3	21.00 to 21.50
Local Scotch, No. 1	22.50 to 23.00
Ohio Strong Softeners, No. 1	24.00 to 25.00
Southern Silvery, according to Silicon	24.65 to 25.15
Southern Coke, No. 1	24.15 to 24.65
Southern Coke, No. 2	23.65 to 24.15
Southern Coke, No. 3	23.15 to 23.65
Southern Coke, No. 1 Soft	24.15 to 24.65
Southern Coke, No. 2 Soft	23.65 to 24.15
Foundry Forge	22.65 to 23.15
Southern Gray Forge	22.65 to 23.15
Southern Mottled	22.65 to 23.15
Southern Charcoal Softeners, according to Silicon	25.00 to 26.00
Alabama and Georgia Car Wheel	26.50 to 27.00
Malleable Bessemer	23.00 to 23.50
Standard Bessemer	24.00 to 24.50
Jackson County and Kentucky Silvery, 6 to 8 per cent. Silicon	25.10 to 26.15

Bars.—There has been a more determined effort to advance prices on Bar Iron during the past week, the largest independent interest in the market quoting nothing under 1.95c. There have been offerings of one or two single carloads at 1.75c., but sales of other lots have been made at 1.80c. to 1.82½c., Chicago. The result has been an unsettled market, with buyers indisposed to purchase liberally. Another effort has been made to secure some kind of selling arrangement among the mills, but thus far without success. It seems probable that the outcome of the present agitation will be a steadier market on a higher level, but just what prices will be finally established cannot be determined at the moment. The volume of new business in Soft Steel Bars has not been large, but there has been a fair degree of activity for this time of the year, and specifying on old contracts has been liberal. The market remains firm at 1.75c. to 1.90c. Hoops have been slow and easier in tone, but without change in prices, which continue at 2.10c. to 2.25c. Angles are selling at 2.25c. basis, mill shipment. There has been a good demand from store with sales of small lots of Bar Iron at 2c. and 2¼c., Soft Steel at 2c. to 2.25c., Angles at 2.50c. and Hoops at 2.50c., base, from warehouse.

Structural Material.—Liberal orders have been placed for all kinds of Structural Material, but mainly for bridge work. The Burlington road is in the market for 50,000 tons and the contract will probably be closed to-day. There have been other sales in 1000, 2000 and 3000 ton lots, aggregating about 18,000 tons. Among the orders placed has been that for the new building of the Deering Harvester Company. A very strong and confident tone prevails. Domestic Steel, mill shipment, is quoted as follows: Beams, Channels and Zees, 15 inches and under, 1.75c. to 1.90c.; 18 inches and over, 1.85c. to 2c.; Angles, 1.75c. to 1.90c. rates; Tees, 1.80c. to 1.90c.; Universal Plates, 1.75c. to 1.85c. There is an urgent demand for Beams, Channels and Angles in small lots from stores. Angles, 3 inches and upward, are especially scarce and wanted. Beams and Channels from local yards are quotable at 2.50c. to 3.50c., Angles at 2.50c. to 3.50c., Tees at 2.55c. to 3.50c., but premiums are often paid over these prices for special sizes wanted immediately.

Plates.—The situation shows little change. Strength and activity are still the features of prominence, and premiums of $4 to $5 per ton are frequently obtained over official quotations on early shipment, and even at such prices it is difficult to obtain deliveries as desired. Official quotations are nominally as follows: Tank Steel, ¼-inch and heavier, 1.75c. to 2.25c.: Flange, 1.85c. to 2.35c.; Marine, 1.95c. to 2.50c. The demand from store is as urgent as ever, and the market very strong. Prices are, however, unchanged, as follows: Tank Steel, ¼-inch and heavier, 2.30c. to 2.50c.; Tank Steel, No. 8, 2.45c. to 2.55c.; Flange, 2.40c. to 2.75c., all f.o.b. warehouse, Chicago.

Sheets.—Heavy Sheets have continued steady, with a fair demand, but there has been no improvement in the call for Light Sheets, which are weak A report was current that the American Sheet Steel Company have reduced prices, but this was denied. Galvanized Sheets are especially heavy with various discounts made by most dealers. Quotations are unchanged, as follows: No. 27, Black Sheets, 3.15c. to 3.25c., Chicago, for mill shipment, while small lots from store are quotable at 3.45c. to 3.55c. Galvanized Sheets, mill shipment, are offered at 4.45c. to 4.50c., with discounts of 75c. and in some cases even greater, but small lots from store are held at 4.70c. to 4.75c. for No. 27.

Cast Pipe.—The market is strong, and prices have been further advanced by manufacturers. Among the larger sales placed by municipalities have been 600 tons to Paling, Ohio, sizes running from 4's to 12's; 6000 tons to Webster and other small towns surrounding St. Louis, including 3000 tons of 12's, 2000 tons of 8's, the balance in 4, 6 and 16 inches. There has also been considerable demand from railroads for small sizes—that is, 4's and 6's—with sales of a fair tonnage on basis of quotations. Manufacturers quote Cast Iron Water Pipe as follows: 4-inch, $35.75; 6-inch, $33.75; 8-inch and upward, $33; Gas Pipe, $1 per ton higher than Water, f.o.b. Chicago.

Merchant Pipe.—The market has been slow and easier in tone, but prices have been without quotable change. Carloads are quoted as follows, random lengths: Black, ⅛ to ½ inch, 56½ off; ¾ to 12 inches, 63½ off; Galvanized, ⅛ to ½ inch, 43½ off; ¾ to 12 inches, 50½ off.

Boiler Tubes.—There has been a moderate volume of business transacted, and market has remained steady. Prices for mill shipment are as follows:

	Steel.	Iron.
1 to 1½ inches	42½	39
1¾ to 2½ inches	55½	38
2¾ to 5 inches	61	48
6 inches and larger	55½	38

The demand from store has only been moderate, but prices have continued steady as follows:

1 to 1½ inches	35	35
1¾ to 2½ inches	47½	32½
2¾ to 5 inches	55	42½
6 inches and larger	47½	..

Merchant Steel.—There has been quite a good demand for Machinery Spring Steel, and some contracts on Agricultural Steel are pending. Mill shipments are quoted as follows: Smooth Finished Machinery Steel, 2c. to 2.10c.;

Smooth Finished Tire, 1.95c. to 2.10c.; Open Hearth Spring Steel, 2.65c. to 2.75c.; Toe Calk, 2.25c. to 2.40c.; Sleigh Shoe, 1.85c. to 1.90c.; Cutter Shoe, 2.40c. to 2.60c.; Cold Rolled Shafting, 50 off in carload lots. Ordinary grades of Crucible Tool Steel are quoted at 6½c. to 7c. for mill shipments; specials, 12c. upward.

Rail and Track Supplies.—More large railroad orders have been in the market, one for 50,000 tons, but local mills are refusing large contracts for the time being. The only sales reported are about 8000 tons of Heavy Sections at $28 for next year's delivery. It is understood that large orders were placed in the East during the week. The current make of Light Sections of local mills is going rapidly into consumption, and the market has remained firm, with prices ranging from $35 to $40 for various weights. Track Supplies have continued active, especially Spikes, which have been sold liberally for nearby and late delivery. Fastenings are quoted in carload lots: Splice Bars or Angles Bars, 2c.; Spikes, 2.50c.; Track Bolts, with Hexagon Nuts, 3.10c. to 3.45c.; Square Nuts, 2.95c. to 3.10c.

Billets.—There has been no special animation in the market, but 1300 tons of foreign Steel has sold at about $31.25, Chicago, for quick shipment, and about 5000 tons a shade under $31 for October, November and December delivery. Resales of domestic Open Hearth Billets are being made at about $31 in quantities ranging from 1000 to 5000 tons, but smaller sales have been made at $35 to $40, according to analysis, buyer and time of delivery.

Old Material.—There has been a further hardening of the market, with a good demand and moderate offerings of nearly all kinds. Sales have been confined to carloads as a rule, although there have been a few transactions of 50 and 100 ton lots. Some purchases of foreign Scrap are being made in Germany for shipment via New Orleans. Sales made during the week in a few 100-ton lots have been at the following quotations per gross ton:

Old Iron Rails	$24.50 to $25.00
Old Steel Rails, mixed lengths	18.50 to 19.50
Old Steel Rails, long lengths	23.50 to 24.50
Heavy Relaying Rails	32.00 to 33.00
Old Car Wheels	21.00 to 22.00
Heavy Melting Steel Scrap	19.00 to 19.50
Mixed Steel	15.50 to 16.00

The following quotations are per net ton:

Iron Fish Plates	$22.50 to $23.00
Iron Car Axles	25.00 to 26.00
Steel Car Axles	23.00 to 23.50
No. 1 Railroad Wrought	21.00 to 21.50
No. 2 Railroad Wrought	18.50 to 19.00
Shafting	19.00 to 20.00
No. 1 Dealers' Forge	16.50 to 17.00
No. 1 Busheling and Wrought Pipe	14.50 to 15.00
Iron Axle Turnings	14.50 to 15.00
Soft Steel Axle Turnings	14.00 to 14.50
Machine Shop Turnings	13.75 to 14.25
Cast Borings	9.50 to 10.00
Mixed Borings, &c	9.50 to 10.25
No. 1 Boilers, cut	14.50 to 15.00
Heavy Cast Scrap	15.00 to 15.50
Stove Plate and Light Cast Scrap	11.00 to 11.50
Railroad Malleable	16.25 to 16.75
Agricultural Malleable	.... to 15.00

Metals.—Copper has been without activity and barely steady in tone, but prices have been without change. Lake is selling at 12¼c. in carload lots and 12½c. to 12¾c. in a jobbing way. Pig Lead has continued firm, with a good demand at 4.05c. for Desilverized in 50-ton lots and 4.07½c. in carload lots. Sheet Zinc has met with a good demand, and continued strong at 6½c. in carload lots and 6.65c. in lots of 600 lbs. Old Metals have continued slow and easy without change in prices, which are as follows: Heavy Cut Copper, 11¼c.; Red Brass, 11¼c.; Copper Bottoms, 10c.; Lead Pipe, 3.80c.; Zinc, 3½c.

Coke.—The offerings have been light, and the market has been very strong, with full prices readily obtained. Connellsville 72-hour Foundry Coke and Virginia and West Virginia are quotable at $6 to $7 on track, Chicago, for prompt delivery.

Philadelphia

FORREST BUILDING, July 22, 1902.

The situation in Iron and Steel has lost none of the peculiar characteristics which it has had for a good many weeks past. The strike in the anthracite coal regions is unbroken, Coke is scarcer than ever, yet in some mysterious manner work continues much the same as in ordinary times. The last monthly furnace report shows that this is a fact beyond dispute. Nevertheless the price of fuel is about double what it would be under normal conditions, and is so hard to get that it is evidently cleaned up to the last carload, hence the daily supply is regulated by the daily production. The same remarks would apply to Pig Iron, although a portion of the supply is intermittently from abroad. Vessels are running pretty regularly with 500 to 2500 ton lots, although only a small portion is available to new buyers, most of it having been sold to arrive, and a good deal of that for through shipments to interior points. It is not noticeable, however, that prices are any dearer than they were a week ago. Sellers are not working for higher figures, their ideas being to secure material for their more needy customers rather than to make fancy prices. Spot and August Iron is, of course, very scarce, and for deliveries of that kind prices are liable to be somewhat extreme—$23 to $24 or may be more for No. 2 X Foundry. All depends upon who has the Iron and who wants it. In the more advanced products the market is a little irregular. Plates are active and strong. Bars also hold up remarkably well, but there is no difficulty in getting fairly prompt deliveries; so that the general situation may be reported as quite favorable, but with less aggressiveness pending further developments.

Pig Iron.—There is but little to say in regard to Pig Iron, beyond what has been said continuously for several weeks past. For July and August shipments buyers have to make the best terms they can and take whatever brands can be made available. In the majority of cases the purchases are not large, but are to piece out with on account of non-deliveries, or part deliveries, of iron bought earlier in the year. In such cases prices run at $23 to $24 for No. 2 X Foundry and $20.50 to $21 for Gray Forge. Foreign Irons are also used to fill in with at prices ranging from $22.50 to $23.50, ex-ship, for Scotch, and $20.50 to $21 for Middlesboro. Lower prices would be made for shipments at a later date, but consumers are not disposed to speculate; so that unless deliveries can be guaranteed within a very brief period, offers are liable to be turned down. For deliveries of American Iron during the last quarter of the year there are plenty of buyers at $22 to $22.50, delivered at nearby points; but makers are so well sold up that they are not in a position to accept additional business and, moreover, in view of the fuel situation they are not inclined to make further commitments. The same remarks apply to the first half of 1903, although business could be done at the inside figure, providing that the buyer is strictly gilt edged. Some sales have been made (at very full figures, too) for deliveries commencing April and running through along to December of next year. The feeling in the trade is distinctly strong, but, as we said before, there is less pressure to place orders unless for this year's shipments, in view of the possibility of heavy importations and of a large increase in the home production when the strike is settled, which, of course, is merely a matter of time anyway. For the present therefore the market has a quieter appearance, but there can be no doubt as to its inherent strength. It is difficult to quote prices with much exactness, but the following are a fair average of to-day's market for 1903 deliveries and for this year 50c. to $1 more, according to circumstances:

No. 1 X Foundry		$23.50 to $24.50
No. 2 X Foundry		22.00 to 22.50
No. 2 Plain		21.00 to 22.00
Standard Gray Forge		20.50 to 21.00
Basic		20.50 to 21.00
Low Phosphorus	Prompt shipments or spot.	23.00 to 23.50
No. 3 Middlesboro		21.00 to 22.00
Scotch Irons		22.50 to 23.50

An advertisement in Special Notices will no doubt be of interest to consumers—viz., that Pilling & Crane are offering spot Pig Iron, English or Scotch.

Billets.—The market is a little inclined to sag off, as buyers are not bidding very freely. Foreign Steel could be done at about $29.50 to $31; American, $31.50 to $32.50 for Ordinary Soft Steel.

Plates.—The demand keeps up to the full capacity of the mills, and in many cases deliveries cannot be made as quickly as desired. The output is very large, however, and with normal supplies of fuel new records of production would be made. But consumption is also steadily increasing, so that prospects could hardly be more satisfactory than they are at the present time. Prices firm and unchanged, as follows: Small lots, 2.10c. to 2.15c. Carload lots and upward: ¼-inch and thicker, 2c. to 2.05c.; Universals, 2c. to 2.05c.; Flange, 2.10c. to 2.20c.; Fire Box, 2.25c. to 2.30c.; Marine, 2.30c. to 2.35c.; Charcoal Plates, C. H. No. 1, 2½c.; C. H. No. 1 Flange, 3c.; C. H. No. 1 Flange Fire Box, 3½c.

Structural Material.—There is a steady run of business, but "at a price," deliveries can be had with a fair degree of promptness. Some mills are quoting about 2.50c., f.o.b. cars, others get as much as 3c. for immediate shipments, while foreign can be had at from 2.25c. to 2.35c., but, of course, a good deal depends upon deliveries and the class of material required. The above prices are for carload lots and upward of Beams, Channels, Angles, &c.

Bars.—There is a very good demand, and during the past week deliveries have been urgently called for. A larger production is expected, however, as some of the local mills have commenced operations after several weeks suspension of work due mainly to differences in regard to labor. Refined Bars are quoted at 1.95c. to 2c., carload lots and upward, and 2c. to 2.10c. for Steel from nearby mills.

Sheets.—The market is rather quiet, and prices are easy without being lower, except for a specially gilt-edged order. Stocks are very light, however, and there is little doubt but everything will be taken clean up before the season is ended. Prices are somewhat irregular, Best Sheets quoted about as follows (Common Sheets one to two-tenths less): Nos. 10

and 12, 2.30c. to 2.40c.; No. 14, 2.50c.; Nos. 16 and 17, 2.80c.; Nos. 18-21, 3.10c.; Nos. 26, 27, 3.30c.; No. 28, 3.50c.

Old Material.—The market is a trifle dull, except for Steel, which is well taken at full prices. With the resumption of work at some of the local mills it is expected that stocks will soon be considerably lightened. Prices fairly steady, with bids and offers about as follows for deliveries in buyers' yards:

Old Steel Rails	$21.25 to $21.75
Heavy Steel Scrap	21.00 to 21.50
Low Phosphorus Scrap	27.50 to 29.00
Old Steel Axles	27.50 to 28.50
Old Iron Rails	24.50 to 25.50
Old Iron Axles	29.00 to 30.00
Old Car Wheels	20.50 to 21.50
Choice Scrap, R. R. No. 1 Wrought	23.00 to 24.00
Country Scrap	18.75 to 19.75
Machinery Cast	17.75 to 18.75
No. 2 Light Scrap (Forge)	18.00 to 19.00
No. 2 Light Scrap (Ordinary)	15.50 to 16.50
Wrought Turnings	16.50 to 17.50
Wrought Turnings, Choice Heavy	18.50 to 19.00
Cast Borings	10.50 to 11.00

F. R. Phillips of F. R. Phillips & Sons Company has just returned from a three months' trip in England and on the Continent making purchases of steel. W. Vernon Phillips sailed on the 19th inst. to follow up the shipments on the various contracts and in connection with new business. They have shipped a heavy tonnage, and have been successful in securing a very satisfactory quality of material.

Cleveland.

CLEVELAND, OHIO, July 22, 1902.

Iron Ore.—The shipment of Iron Ore down the lakes has not lessened in amount, although there has been a congestion of boats both at the upper and the lower lake ports which might seem to indicate that such a result is inevitable. The seeming paradox in the situation is accounted for by the statement that the Ore trade is now crowded with vessel capacity that ought to find employment elsewhere. It is a well-known fact that the upper lake docks can load much more Ore than the lower lake docks can unload. The constant overtaxing of the capacity of the upper lake docks, therefore, inevitably results in the continued congestion of the docks at the unloading ports. There is no change in the expectation that the Ore movement for July will beat any record in history.

Pig Iron.—In this territory there is not a day's supply in stock, and it does not appear now to be possible for the furnaces to collect any with the present ravenous consumption. The consumers are taking every pound that the furnaces can possibly produce and are calling for more. One of the Pig Iron producers said yesterday that in case his furnace was to shut down for a day the mills and foundries dependent upon that furnace would likewise have to suspend operations. Such a situation adds interest and importance to the Coke supply, which at the present time is none too good. The furnaces in the valleys are still in blast, none being compelled to bank their fires; yet this possibility is not very far removed, and any further curtailment of the supply would immediately make it necessary for a few of them to suspend operations. There is not much Iron being offered on the market now, but such as is sold goes on the basis of $24 to $25 for No. 1. It is, perhaps, unnecessary to say that the sales for early delivery which are made now are confined to single carload lots. There is interest in the sales for delivery past the first of the year, and some contracts are now being taken which entail deliveries throughout the entire first half. Many of the furnacemen have given up any hope of a greatly reduced price for next year's market, since the law of supply and demand seems dead set against any very great reduction. To be sure, the abnormal prices of the present time will hardly hold over until next year, but there is a very strong probability that there will be no reduction from the present selling price of $21 for No. 2. Further changes in the production of Foundry grades, which may make it necessary to carry some orders over into 1903, may possibly enhance the value of the Iron yet to be sold. In Bessemer Pig Iron there is but little activity at the present time. Steel makers have been looking around this week for some extra supply of Bessemer, but even small lots seem hard to obtain. On such sales the furnaces are now exacting $21 to $22 at the furnace, and the supply does not seem to be at all adequate to the needs even at that figure. There is also some talk of sales into the second quarter of next year, but as yet the Bessemer Association has done nothing toward fixing the price. In the Basic trade there is both a good call for material for immediate shipment and a heavy inquiry for delivery during the first and second quarters of next year. Some of the furnaces here have sold up their supply for the first quarter and are not in position as yet to sell for the second quarter, their price policy not having been determined. Whatever uncertainty there may be about Bessemer prices does not hold with Basic dealers, as they insist that any sales now must be on a higher plane of prices.

Finished Material.—The demand for Finished Material keeps up at a pace which indicates something of security for another year's good business. The evidence most strongly brought to the front of a possible continuance of the present speed of production is the enormous sale of Steel Rails, Structural Steel and Plates for 1903 delivery. Rails especially predominate. In Light Rails there is a tremendous demand. The price has gone booming, and now ranges between $38 and $40. In Structural Steel the sales for 1903 delivery continue, and it is hardly possible now that many more orders taken at this time can be filled until well on toward the end of the first half, if, indeed, they can be filled at all until into the third quarter of next year. Most of the consumers have been placing specifications with the mills on old orders, which often exceed the stipulations of the original contract. The demand for material for immediate delivery is very heavy, and some of the mills which happen to have small quantities are charging jobbers' prices, and are getting, therefore, about 2½c. at the mills. The jobbers who have small quantities of Structural Steel are selling out to old customers at the regulation prices, getting from 2½c. to 3c. for their material, deeming future friendly relations with patrons more valuable than immediate profits a little greater than the early spring business, when the prices were fixed, seemed to indicate. The demand for Plates for immediate delivery is very large, and any one having even small quantities can obtain 2¼c. very easily. In fact, some consumers have come upon the market asking for material at that price. In the meanwhile the sales for next year's delivery continue to be made at the old association price of 1.60c., Pittsburgh, for while the association on Plates no longer exists, the price which that organization fixed still governs the actions of the larger mills constituent to the pool. By maintaining the prices on the lower plane the mills are hoping to infuse conservatism into the market. A few of the Bar mills, which recently went out of commission to make repairs, have resumed operations, and the supply of Bar Iron is a little freer on the market, but the accession is hardly noticeable since the Bar Iron trade has not been a feature for several months. The price holds nominally at 1.80c., Pittsburgh. In the Bar Steel trade the energy is unabating, and the demand is enormous. The smaller sizes are a little freer still, and can be had in four or five weeks, but the larger rounds are still scarce and continue to demand and obtain a premium. The prices hold at 1.60c., Pittsburgh, for Bessemer, and 1.70c., Pittsburgh, for Open Hearth Steel Bars. The Sheet trade is still one of the discouraging features of the market, and together with Pipe and Wire represent the weak spot. The demand has not increased, and the smaller mills show a growing tendency to cut the established prices to induce business to move more freely. The quoted prices, however, remain as they have been for several months at 2.50c. for No. 10 as a basis for the gauges between Nos. 10 and 16, and 3.50c. to 3.60c. for No. 27 as a basis on the gauges between Nos. 17 and 28. There has been more talk of a slight relief in the Billet situation due to the shutting down of some of the mills, but this does not seem to have come, and there is as big a demand for Steel as at any time during the year. The price still holds up about $32.

Old Material.—The Scrap men report a little easing up in the buying, but nothing serious enough to indicate a slump. The present is probably a natural reaction from the strenuous demand of the past month or six weeks, as the scarcity of Pig Iron has been a great drain upon the Scrap supply. Prices hold as they have been quoted as follows: No. 1 Wrought, $19.50, net; Iron Rails, $27.50, gross; Iron Axles, $26, gross; Cast Borings, $10, gross; Wrought Turnings, $15.25, gross; Cast Scrap, $16, gross; Car Wheels, $19, gross; Heavy Melting Steel, $19, gross; Old Steel Rails, $20, gross.

Cincinnati.

FIFTH AND MAIN STS., July 23, 1902.—(*By Telegraph.*)

In general terms the Pig Iron market shows but little change from the conditions of a week ago. There is an apparent narrowing of opinion as to the outlook for next year, and while there is still quite a wide range in prices which are named both for prompt delivery and for deliveries after the first of next year, yet Iron producers are apparently coming nearer to a common standpoint. It is understood here that a recent conference in New York among representatives of the leading furnace interests in the South resulted in the fixing of 1903 Iron on the basis of $17, Birmingham, for No. 2 Foundry, this with the understanding that the buyer assume the responsibility for possible change in freights. It is claimed there was an effort made to place the basis for sale at $18, but the action of some interest in holding back resulted in a compromise at the figure named. There is now, so far as known, no Iron offered on the basis of $16.50, Birmingham, which was the ruling price a week ago. In cases where the buyer is objecting to the assumption of possible freight changes Southern furnaces in some instances at least are guaranteeing the present rate to Ohio River points for an extra flat charge of 50c. and to points such as Indian-

apolis, Dayton and Springfield a charge of 75c. With the exception of Forge Irons the market for spot deliveries is practically unchanged, and the amount of Foundry Irons in sight is nothing but a meager dribble, which comes from here and there as the case may be. Under these circumstances it goes without saying that prices are strong and at least as high as they have been. When it comes to the mention of Forge Iron the case is a little different, and if there can be said to be any such thing as a weak spot in the situation it is in this class of Iron. It is known that there is quite a little body of this being offered and buyers' are chary at the ruling prices. As far as Northern Irons are concerned the situation is also practically unchanged. Offerings are very scarce and the prices practically unchanged. It is understood that the leading Southern interest is again in the market for delivery, commencing about the third or fourth month of next year. While there is quite a little inquiry for next year's delivery and a pretty fair aggregate of sales being recorded, yet the market is nevertheless a vacation one and a spirit of laziness seems to dominate the situation. All next year's sales are being made subject to change in freight rates. Freight rate from Hanging Rock district is $1.10 and from Birmingham $2.75. We quote, f.o.b. Cincinnati, for 1902 delivery as follows, this year's delivery:

Southern Coke, No. 1	$21.25 to $22.25
Southern Coke, No. 2	20.75 to 21.75
Southern Coke, No. 3	20.25 to 21.25
Southern Coke, No. 4	19.75 to 20.75
Southern Coke, No. 1 Soft	21.25 to 22.25
Southern Coke, No. 2 Soft	20.75 to 21.75
Southern Coke, Gray Forge	19.75 to 20.75
Southern Coke, Mottled	19.75 to 20.75
Ohio Silvery, No. 1	24.60 to 25.10
Ohio Silvery, No. 2	24.10 to 24.60
Lake Superior Coke, No. 1	25.10 to 25.60
Lake Superior Coke, No. 2	24.60 to 25.10
Lake Superior Coke, No. 3	24.10 to 24.60

Car Wheel and Malleable Irons.

Standard Southern Car Wheel, chilling grades	$27.00 to $27.50
Standard Southern Car Wheel, No. 2	26.50 to 27.00
Lake Superior Car Wheel and Malleable	25.00 to 26.00

Quotations for first six months of 1903, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1	$20.25 to $20.75
Southern Coke, No. 2	19.75 to 20.25
Southern Coke, No. 3	19.25 to 19.75
Southern Coke, No. 4	18.75 to 19.25
Southern Coke, Gray Forge	18.75 to 19.25
Southern Coke, Mottled	18.75 to 19.25
Southern Coke, No. 1 Soft	20.25 to 20.75
Southern Coke, No. 2 Soft	19.75 to 20.25

Plates and Bars.—The market for Bars and Plates is strong and prices are in the main pretty firmly held. What weakness there is exists in Shapes, and this is not regarded as anything very serious by dealers. The general circumstances and the season considered the market is a fair one.

Old Material.—No change reported in prices or conditions. Seasonable conditions generally prevail, though prices are being firmly maintained.

It is announced here that the La Follette Coal, Iron & Railroad Company of La Follette, Tenn., put their new furnace in blast July 22 and 23. In view of the fact that the furnace is quite a large one and will have a capacity of 250 tons daily and has a clean order book, much interest is being expressed in the naming of an agency here to represent their Iron. It is understood that the Iron will not be placed immediately on the market or until they have been running for a sufficient length of time to enable them to definitely determine the quality of their output by analysis.

Pittsburgh.

(By Telegraph.)

PARK BUILDING, July 23, 1902.

Pig Iron.—A heavy buying movement is going on in No. 2 Foundry Iron for delivery next year and a large tonnage has been sold on the basis of $21.75 to $22, Pittsburgh. Bessemer Iron is somewhat quiet, no large buyers being in the market and furnaces practically sold up. The sales of 10,000 tons of Basic Iron referred to last week have been increased to about 15,000 tons, the price being $21, delivered, the Iron netting the furnace about $20. Coke is still very scarce and another stack in the Shenango Valley has been compelled to bank. Forge Iron is very firm at $21 to $21.25, Pittsburgh. Bessemer is $21 to $21.50, at Valley furnace, for delivery this year. We note a sale of 3000 tons at $21, at furnace, for shipment over last six months, and one of 500 tons for prompt delivery at $21.50, at furnace.

Steel.—While the Steel market is somewhat quiet as far as sales are concerned, yet the market is strong and consumers who go out in the market expecting to buy Steel at low prices find they cannot do it. Foreign Billets can be laid down in Pittsburgh at about $31 and Sheet Bars at $31.50 to $32. Domestic Billets are $32 to $33 and Sheet Bars $33 to $34, maker's mill.

(By Mail.)

The situation in the Iron trade is without material change with the exception that several of the large concerns report a slightly heavier tonnage. While the market is quiet, yet it is firm, and with present high prices of Pig Iron and Steel and the heavy tonnage that has been booked by the mills in Rails, Structural Material and Plates, it does not seem that prices on other lines of finished product, which are quiet just now, such as Sheets, Wire, Wire Nails and Tin Plate, can decline very much, if at all. On the other hand, some in the trade believe that prices may be slightly higher along about September 1, when fall trade is expected to open up. The voting among the lodges of the Amalgamated Association on the proposed cut in wages of 25 per cent. on Tin Plate to be made for the Standard Oil Company has not yet been closed. It is said some of the lodges have refused to accept the cut. There is still a shortage in Coke, but only one of the Valley furnaces has been compelled to shut down for want of fuel.

Muck Bar.—There is only a fair inquiry and the best grades of Muck Bar are held at $36.25 to $36.50, delivered, Pittsburgh. A sale of 1500 tons is reported at the first named price.

Rods.—While the market is quiet as far as sales are concerned, yet prices are firm. We quote Bessemer Rods at $36, Pittsburgh.

Ferromanganese.—We quote German Ferro at $52 and English at $52.25, Pittsburgh.

Steel Rails.—No large contracts have been placed since our last report. We quote at $28 at mill for Standard Sections.

Bars.—A fair volume of business is being placed in Bars and a local mill reports it has gained 5000 to 6000 tons in the past week. Several of the large agricultural works are still in operation and are specifying heavily. We are advised the official prices on Steel and Iron Bars are being rigidly held. We quote Steel Bars at 1.60c., half extras, for carload and larger lots, while small lots bring 1.70c. to 1.75c. All specifications for less than 2000 lbs. of a size are subject to the following differential extras: Quantities less than 2000 lbs., but not less than 1000 lbs., 0.10c. per lb. extra. Quantities less than 1000 lbs., 0.30c. per lb. extra, the total weight of a size to determine the extra, regardless of length. We quote Iron Bars at 1.80c. in carloads and 1.90c. in small lots, f.o.b. Pittsburgh, extras as per National card.

Plates.—The American Ship Building Company are reported to have taken contracts for 10 Steel boats for the Great Lakes & Lawrence Transportation Company, to be delivered next spring. It is understood that a very heavy tonnage in Plates and Shapes for these boats has been placed, much of it going to a local mill. The Standard Steel Car Company, now building a Steel car plant at Butler, are in the market for 400 tons of Plates a day. Two of the leading local mills continue to quote the official price of 1.60c. on Plates, but will not promise deliveries before next year. Other mills that can ship within three or four months are getting from 1.75c. to 1.85c. for Plates in large lots and up to 2c. for small lots. Official prices are as follows: Tank Plate, ¼ inch thick and up to 100 inches in width, 1.60c. at mill, Pittsburgh; Flange and Boiler Steel, 1.70c.; Marine, Ordinary Fire Box, American Boiler Manufacturers' Association specifications, 1.80c.; Still Bottom Steel, 1.90c.; Locomotive Fire Box, not less than 2.10c., and it ranges in price to 3c. Plate more than 100 inches wide, 5c. extra per 100 lbs. Plate 3-16 inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra; No. 9, $5 extra. These quotations are based on carload lots, with 5c extra for less than carload lots; terms, net cash in 30 days.

Structural Material.—The Standard Steel Car Company are in the market for 225 tons of Shapes per day. While tonnage is perhaps not as large just now as it was some time ago, owing to the fact that the big contracts are mostly placed, yet there is a steady stream of orders which keeps the mills filled up to the guards. The three local Structural mills, Carnegie Steel Company, Jones & Laughlins and Cambria Steel Company, have all booked a heavy tonnage for next year. Prompt deliveries of Beams and Channels bring anywhere from 2c. to 3c. a lb., depending on size of the order and how soon the material is wanted. Official prices are as follows: Beams and Channels, up to 15-inch, 1.60c.; over 15-inch, 1.70c.; Angles, 3 x 2 up to 6 x 6 inch, 1.60c.; smaller sizes, 1.55c. to 1.60c.; Zees, 1.60c.; Tees, 1.65c.; Steel Bars, 1.50c., half extras, at mill; Universal and Sheared Plates, 1.60c.

Hoops and Bands.—Only three companies in the Pittsburgh district roll Hoops and Bands, these being the American Steel Hoop Company, Pittsburgh Steel Company and Sharon Steel Hoop Company of Sharon. Their mills are comfortably filled for several months ahead and the tone of the market is fairly strong. We quote Hoops at 1.90c. for 250-ton lots and over and 2c. in carloads. Bands are 1.60c. for Bessemer stock, 12-gauge and heavier, while for Open Hearth stock $2 per ton advance is charged.

Sheets.—A slightly better inquiry for Galvanized Sheets is reported and the tone of the market on these is claimed to be stronger. A fair tonnage in Black Sheets is being placed, but the mills could handle more business if they had it. Output of Sheets has been cut a good deal by the shut down of a number of mills for repairs and stock taking, some of which will not get started for two or three weeks. We quote No. 27 Black Sheets, box annealed, one pass through cold rolls, at 2.90c. and No. 28 at 3c. in carload lots. Stocks of Sheets at some of the mills and in the hands of jobbers are reported quite heavy. For small lots jobbers charge 3c. to 3.10c. for No. 27 and 3.10c. to 3.20c. for No. 28. Galvanized Sheets in carloads are about 75 off and 70 and 10 to 70 and 5 in small lots.

Skelp.—The market is somewhat quiet. We quote Grooved Iron Skelp at 2.12½c. to 2.15c. and Sheared at 2.15c. to 2.25c. Grooved Steel Skelp is 2.20c. to 2.25c. These prices are f.o.b. at mill.

Merchant Steel.—A fair amount of tonnage is being placed, but there is more or less cutting in prices, owing to the starting up of so many new mills. The larger makers are pretty comfortably fixed on old contracts, but some of the new mills are going after tonnage very vigorously. We quote Tire Steel, best grades, at 2.15c. to 2.25c.; Open Hearth Spring, 2.50c.; Toe Calk, 2.10c. to 2.15c.; Smooth Finished Machinery Steel, 1.90c. to 2c.; Cold Rolled Shafting, 47 per cent. off in carloads and 42 per cent. off in less than carloads, delivered in base territory. Tool Steels are 6½c. to 8c. for ordinary grades and 12c. and upward for special grades. These prices are f.o.b. at mill.

Merchant Pipe.—For this season of the year the mills regard the volume of business now being placed in Pipe as very satisfactory. For the larger sizes of Pipe used in gas and oil lines a very heavy tonnage has been placed, and the larger mills will be employed on these contracts for months to come. Discounts in carloads are as follows:

Merchant Pipe.	Black.	Galvd.
⅛ to ½ inch, inclusive	60	48
¾ to 12 inch, inclusive	67	55

Scrap.—The market has been exceedingly quiet this month and prices on nearly all kinds of Scrap are somewhat lower. We quote heavy melting stock at $21, gross ton; No. 1 Railroad Wrought Scrap, $20.50 to $21, net ton. Cast Scrap is firm at about $19, net ton, and there is a heavy demand for it, owing to high prices and scarcity of Pig Iron. Car Wheels are $20.50 to $21, gross ton; Cast Iron Borings, $11, gross ton; Wrought Turnings, $13 to $13.50, net ton, and Old Iron Rails, which are very scarce, are $26, gross ton, delivered, Valley.

Coke.—Demand for Coke at the present time is the heaviest ever known in the history of the Coke trade. This is due to the fact that practically all of the blast furnaces in the country that can run are in operation, and also to the Anthracite Coal strike, which has compelled many furnaces that formerly used Coal to go back to Coke. As high as $3.50 to $4 a ton is being paid by these furnaces for prompt shipments of Furnace Coke, and in some cases they do not get it. There is still a shortage in car supply and some of the Valley furnaces, and also stacks in the Hanging Rock and Kentucky regions, are very short of Coke, and one stack at Columbus and several at other places have been compelled to bank down. The *Courier* reports 20,622 ovens active last week and an output of 249,510 tons. It is very difficult to quote prices on Coke, but prompt shipments of Furnace bring from $3 to $4 a ton and Foundry from $3.50 to $4 a ton. Most consumers are covered by contracts on the basis of about $2.25 for Furnace and $2.75 to $3 a ton for Foundry.

There is a project on foot looking toward the consolidation of several of the large realty and construction companies of New York. The present plans provide for the combination of the G. A. Fuller Company, New York Realty Corporation, Aliance Realty Company, Century Realty Company and certain real estate interests of the Central Realty Bond & Trust Company. Several meetings have been held during the last few days, but the plan of consolidation has not as yet been fully determined upon. It is stated that the capital stock of the new concern will not be less than $65,000,000, divided into $30,000,000 6 per cent. preferred and $35,000,000 common stock. The name of the new concern will probably be the Fuller Realty & Construction Company. Richard G. Babbage, secretary of the G. A. Fuller Company, stated to a representative of *The Iron Age* that the purpose was to form a company having the best possible credit for carrying on building operations here and abroad on a most extensive scale. He said that it had not been decided whether a holding company would be formed to acquire the control of the constituent companies, or what definite plan would be pursued.

Birmingham.

BIRMINGHAM, ALA., July 21, 1902.

The market for spot and nearby deliveries of Iron continues, as to conditions, practically unchanged. There is too keen a demand for prompt delivery Iron to permit a uniformity in price, and it may happen, and does happen, that orders for the same grade are filled at the same time at material differences in values. It is a matter of remark that a good sprinkling of the buying of this prompt delivery Iron is by firms whose usual requirements are covered by forward purchases. And in a majority of cases this usual caution has been followed. But for reasons frequently explained there has been delayed delivery, compelling purchases to fill the gap made by these deficiencies.

There was another sale of Charcoal Iron, say 200 tons, at $26, delivery in 1902, and there was also a sale of 1000 tons, at $23, for delivery the first half of 1903. Gray Forge is quoted at $17.50 for spot and nearby delivery, and sales of No. 2 Foundry are reported at $20, but only in lots of moderate and small size. Some Silver Gray in small quantity is reported at $21. There is as yet no prospect for obtaining these grades or any other grades of Iron in any lots of magnitude during this year. A very careful and conservative view of present conditions forces one to the conclusion that this district is at least 100,000 tons behind in deliveries, with a poor prospect of catching up at any other than a slow rate for at least this year.

No. 2 Foundry Iron is quoted for the last half of 1902 at $19. Some sales have been made. There is some talk at less value, but no sales were reported to your correspondent. For the first half of 1903 delivery, and particularly for the first quarter, some quote $18 but report no sales. There were very fair sales made for delivery the first half of 1903 at $17, and it is understood here that at the meeting of certain Iron interests in New York during the past week it was concluded that it would be unwise to boost the market above this limit. There were some sales also at $16.50, but it is generally accepted now that $17 for the time being represents sellers' views, and that the market will be fed at such a price as prudence prompts. We may, therefore, with reason, accept that figure as the value likely to prevail for a while for that delivery.

One prominent interest is discouraging business for 1903, prior to March delivery. The inference is that engagements up to that date approximate capacity. But you can hear all sorts of stories about values and conditions, and you can with confidence conclude that the situation has more or less discomforts to all. As to stocks, what there are belong to purchasers on old business with here and there remnants of grades of unexpected output, subject to the market. Shipments are just what facilities permit.

There are reports of sales of Steel Billets, &c., by the Steel mill here to the extent of 20,000 tons at $29, at mill, per ton for Eastern points. The management here are not saying anything about it, and the report is given as a rumor (but unconfirmed) from good sources.

A week has passed since the miners' agreement went into effect, but all of them are not yet at work. There have been in some cases local misunderstandings and disagreements delaying return to work of the miners until they are straightened out. They are not serious enough to excite any apprehension of trouble. The rolling mills were early in the past week supplied with Coal and resumed operations. They could in several departments use additional skilled labor.

The situation as to banked furnaces is gradually easing up, and it will soon be normal again.

The strike of the machinists and boiler makers creates no sensation here. Their number is limited, and the employers are successful in gradually filling the places made vacant by the walk out of the strikers.

The report of the Car Service Association shows that the cars handled for June footed up 48,735, a gain of 10,000 over June, 1902. The Louisville & Nashville Railroad led all the rest, with 21,106 cars.

The Montesano Land Company were incorporated the past week. They are capitalized at $40,000, and have the usual liberal charter. The Alabama Fair Association was reorganized the past week on a "pay as you go" basis, and the preliminary work commenced for the holding of a fair next fall. The grounds will be beautified, additional buildings erected, and efforts directed to a successful meeting.

The report of the Southern Iron Association shows that the total shipments for the first six months of 1902 amounted to 987,716 tons, including Pig Iron, Steel and Cast Iron Pipe, divided into 904,014 tons of Pig Iron and Steel and 83,702 tons of Pipe. January, with 182,208 tons, was the largest shipping month, and May, with 169,739 tons, stood next. The amount of Steel shipped was 52,740 tons, the largest month—May—aggregating 11,259 tons. The heaviest shipping month for Pipe was April, when 17,821 tons went out.

Of these amounts the Birmingham district furnished 472,602 tons of Pig Iron and Steel, and of Cast Iron Pipe 41,745 tons. These figures show what a long road there is before us that we must traverse before we come in sight of Pittsburgh as a competing rival. But all children must learn to crawl before they can walk.

The situation as to labor is unchanged. The intensely hot weather militates against best results and upsets calculations based on past records. We are deficient in all classes and kinds of labor, not because there has been an exodus of labor, but because our industries have outgrown the local supply. We have lost some, but that deficiency has been supplied by reprisals from other districts. But there are so many enterprises acquiring such different degrees of labor that labor has in many cases choice as to the kind it prefers, and, as often happens, the easiest berth has preference.

It is anticipated that in my next letter there may be something definite said as to the location of the contemplated furnace plant of the Alabama Steel & Wire Company.

The French Iron Market.

PARIS, July 1, 1902.

In spite of the dullness in business at Paris the large Iron works are not complaining very much. During the last week there have been meetings of the different syndicates, and the fact has been noted that although the situation was not desperate it left a good deal to be desired. The Ministry of the Colonies and the Navy are, it is true, giving in important orders. Some of the works are very heavily engaged for the Indo-China market, but the requirements of the Government generally and of the railroads are rather limited. Prices, when such work does come up, are not by any means remunerative. Thus the Northern Railroad has given Creusot recently an order for 7200 tires at 18 francs per 100 kg., and the corresponding springs to a works in the Northern Department at 19.45 francs. These prices do not leave any margin whatever. It is true that export orders are sought, but there is nothing to be done in this direction, at least for the moment. However, it is a question which is greatly occupying the French Iron trade. It may be worth noting that the building of new railroads will make it possible to handle at reasonable prices ores whose yield might contribute to lowering the cost of production and may aid us to compete with other European countries. Our foreign commerce continues to show the same characteristics—light importations and a general increase in exports. In Pig Iron we have a weekly importation of about 2500 tons, against 6000 tons in 1901, and an export of 16,000 tons, as compared with 6000 tons. Our blast furnaces are therefore getting rid of their excess production by selling it abroad and more particularly in Belgium, at low prices.

There has been a notable increase in the imports of Pig Iron under the drawback clauses. It amounted to 43,500 tons during the first five months of 1902, as compared with 31,000 tons for the corresponding period of 1901. Imports of Bars and Plates have also increased under the drawback clauses, having been in May 4257 tons in 1902, as compared with 3098 tons in 1901. Our exports amounted to about 1000 tons of Rails in May. On the other hand, in beams importations are insignificant, and exports were only 644 tons in May, 1902, as compared with 1560 tons during the same month last year. This shows that production is adjusted to home consumption and that foreign competition, which was so keenly felt last year, has now practically disappeared.

In the different departments the situation is as follows: In the Meurthe et Moselle the large works are being readily supplied with work. This is shown by the fact that stocks of Pig Iron are being lowered, they having declined 30,000 tons during the last two months. Prices of Pig Iron have grown stronger, and it is stated that the Longwy syndicate is on the point to increase prices 2 francs per ton. At the present time they are 90 francs for Hematite, 70 francs for No. 3 Foundry and 56 francs for Mill Iron. The proposed increase by the syndicate is justified, without doubt, by the demands of the Belgian Coke syndicate. That it can be done is shown by the fact that East Coast Hematite is being sold at 100 francs, f.o.b. cars at Longwy, while Cleveland No. 3 is quoted 87 francs. So far as manufactured product is concerned, the Meurthe et Moselle district is the most favored of all. If the situation in the United States is maintained there might even be possibility of a rise. As a matter of fact, your country continues to supply itself in Europe, so great is the consumption, and so heavily engaged are your producers' facilities. Germany is sending Blooms and finished product, and France is also benefited. One large works, the Acieries de Micheville, is sending a considerable part of their production to the United States.

In the Ardennes district there has been a slight slackening and very little new business is in sight, there being little activity among the bolt works, the nail mills, &c. Iron Bars remain at 16 francs per 100 kg. for No. 2, with ½ franc spread for each class. On large business the market is cut to nearly 15.75 francs.

In the Haute Marne district rolling mills are doing quite well, but there is no assurance as to the future. Buyers hesitate long before placing their orders, and then only take prompt delivery. There has been very little movement in Old Material, Wrought Scrap being quoted 7.25 francs per 100 kg. Generally speaking, the foundries are in an unsatisfactory condition. Prices are low.

In the Loire and Rhone districts Merchant Bars are maintained at 18.50 francs. The Scrap market is dull, but prices for the ordinary grades, particularly for Choice Scrap, are firmly held. We quote 65 francs for Ordinary Scrap and 70 to 80 francs for Plate Shearings and Choice Scrap. Heavy Wrought Iron and Steel Turnings are quoted at 45 francs per 1000 kg.

On August 1 about 1300 workmen will be dismissed by the National Arms Factory at Saint Etienne, the reason being that there are no orders. This has caused a good deal of excitement in this industrial center. In the Northern Department the rolling mill managers met at Aulnoye about two weeks ago. They seem to be in accord as to a rather optimistic view of the situation and it was decreed that prices be maintained.

Cincinnati Machinery Market.

CINCINNATI, OHIO, July 19, 1902.

The general situation in iron manufacturing circles in this locality is as favorable to-day as it has been any time in the past. It is the unanimous opinion of all branches of manufacture that trade is everything that could be desired. Where it has been deemed necessary to secure an advance in the price of finished product there has been no difficulty in securing it. Just now there is considerable in the way of talk as to the necessity of advancing prices on standard iron working tools a further 10 per cent. Whether this will be done universally or not is a mooted question, but there are some manufacturers who will undoubtedly take steps in that direction, as they contend that the conditions fully justify them in the move. Foreign trade, while scattering and in no way equal to the volume of two years ago, is nevertheless showing some improvement, not so much from France and Continental Europe as from out of the way places in every quarter of the globe. Even Spain appears to have forgotten the recent unpleasantness, and is proving a liberal buyer in a good many lines. There is a decided scarcity of good machinists, and some manufacturers have been compelled to look to other points for the necessary men to operate their shops. One of the most striking evidences that the iron working industries in Cincinnati are in fine condition is the large amount of expansion which is under way and contemplated.

In new construction the contemplated enlargement of the J. A. Fay & Egan Company's plant is probably the most important thing in sight at this time. The company have been located for a great many years in the "bottom" district, with offices at Front and John streets, the shops being divided from each other by several streets, connection being made with bridges. At the present location the company have a floor space of 13 acres. The necessity for a new plant has been apparent for some time, and the proprietors have been quietly looking around for a new location. The fact that they were contemplating a change became noised abroad, and efforts were made by other cities and towns to induce the removal to some other point. The location of the new plant, however, has been set at rest by the purchase of the old Blatchley farm on the south side of the Baltimore & Ohio Southwestern Railroad tracks between Bond Hill and Avondale. The company will proceed at once with the erection of buildings which are to be constructed in the most modern fashion, principally one-story in hight and to cover 16 acres of ground. One of the principal improvements will be a large foundry, probably the largest one in this section of the country, which will give employment to between 800 and a 1000 men. The total number of men to be employed in the new works will be in the neighborhood of 3000 when the plant is thoroughly in running condition.

The question of castings has been a serious one with the company for quite a number of years, and at present they occupy the energies of about eight different foundries located at different points in Ohio, Indiana, Kentucky and Alabama. The establishment of the new works is a matter of local congratulation, while the reputation of the builders gives guarantee that they will be second to none in the United States, and probably as makers of wood working machinery the most extensive in the world. The officers of the company report magnificent current trade. The month of June just past aggregated the greatest amount of any month in the history of the company's experience.

One of the chief features in the present trade situation is the very large amount of machines which are being ordered for different points in China. The firm's China representative is now in this city on a visit, and reports the outlook as very encouraging. Quite a number of very fine orders have recently been placed for points in Spain. English trade is also good.

John Steptoe & Co., who have been in business as makers of iron working machine tools for the last 50 years or more, and lately have been located at Elm and Second streets in the manufacture of shapers, are now building a brick factory on the west side of Colerain avenue, south of Hopple street. This location is in what is known as the

stock yards district, where so many of the machine tool factories are now located. The new buildings will be built in the shape of a "U;" 65 feet front by 150 feet in depth will be the size of the main building, each wing will be 65 x 85 feet the main buildings will be two stories and the wings one story each. One wing will be occupied for castings, storage and the other for shipping. They have contracted for most of their new equipment, though they are still in the market for a portion. When established in their new quarters the firm will have an increased capacity of about 40 per cent. over that which they now have. They report trade as excellent, with about 15 per cent. of their product going abroad. This export business is made up almost entirely of orders for single machines scattered through every country on the face of the globe. The outlook as evidenced by the inquiry is excellent.

The Lodge & Shipley Machine Tool Company, "makers of lathes, good lathes only," are in the midst of a season of expansion which when completed will give them a very handsome increase in capacity. In the first place they have added an addition of 108 feet in the rear of the shop No. 1, the addition being uniform with the original construction and making that shop 90 x 450 feet. In fitting up this addition it will be necessary to rearrange the order of the entire plant, and one of the chief improvements added will be a 15-ton traveling crane. An addition of 60 x 60 feet, two stories in hight, has also been made in the rear of shop No. 2. They are also laying the foundation at present for a one-story warehouse 40 x 125 feet, to be situated in the yard between the two main shops. They also have a two-story substantial frame iron clad building, 50 x 135 feet in size, nearing completion, the first floor of which will be occupied by the screw machine department; the second floor will be their pattern shop. It is also noted that while the firm is industriously at work on the useful they are not neglecting the æsthetic side of life. They have regraded the lawn lying along Colerain avenue and ornamented it with something very pretty in the way of flower beds. The company's order books show just exactly what this expansion indicates and the members are enthusiastic over the general situation.

The Cincinnati Shaper Company are just commencing the erection of modern shops on the large lot lying between the Lodge & Shipley plant and Spring Grove avenue. The buildings when completed will be mainly one story in hight, the main shop being 90 x 290 feet, the office building 30 x 90 feet, the engine and boiler building 40 x 78 feet, all to be built of brick, full mill construction. It was the desire of the company to have the new plan in operation by October, but delays of one sort or another have occurred which will probably postpone the opening a month or six weeks later. They are now ordering equipment for the new shops, which when fitted up will give them an advance of 50 per cent. over the present capacity. One feature of the business as reported by the officers of the company is the increasing demand for heavier shapers. Orders have been coming in plentifully, and while foreign trade is not entirely missing, yet the great bulk of the business is coming from domestic sources.

The Niles Tool Works of Hamilton are working on a large contract for the Hamilton Corliss Engine Works, the tools to be used in the equipping of the new shop which the purchasers are now erecting. Among the machines in the order is one for a Corliss cylinder borer to bore cylinders 72 inches in diameter; also a 20-foot boring mill, especially heavy construction. The total amount of this contract will be about $150,000. The company are also building some specially large boring mills for the Allis-Chalmers Company. They are getting along very nicely with the large British Westinghouse contract which they took six months ago. They are also making some very heavy tools, mainly boring mills, for the Midvale Steel Company of Philadelphia. Among the recent orders from foreign parts is one for two gun lathes for boring and finishing guns for the Spanish Government Arsenal at Fabrica de Trubia. The feature of the present trade appears to be the specially large demand for heavy boring mills for electrical and engine building works in the eastern part of the United States.

The Long & Allstatter Company of Hamilton report an excellent current business, mainly from domestic sources. What foreign trade there is is generally in single orders over widely scattered territory, with quite a number of orders from the Philippines and some from Cuba. They are now building quite a number of large multiple punches with automatic feet and spacing tables, to punch plates 10 feet wide, 50 feet long and ½ inch thick. These machines will punch 36 holes 13-16 inch diameter to ½ inch thickness at each stroke of the slide. These are the largest machines which the company are building at the present time and are for use in shops manufacturing steel cars. The additions to their shops, which were put up six months or so ago, are now fully equipped and in operation.

The Cincinnati Punch & Shear Company report business in a very healthy condition. Orders are not multiplying and piling up at the rate they did one year ago, but are coming in evenly and steadily, keeping abreast with the capacity to produce them and in the main representing the heaviest class of tools which the company turn out. Shipments are well scattered through all points of the country and are coming in through the usual means of advertising and established agencies without necessity for special drumming. It is interesting to note that the experience of this company in the past 10 years is that formerly a punch with 24-inch throat was considered a very large machine. Now their orders range up to 60-inch throat and the average of production is somewhere between 24 and 42 inches. One of the recent shipments was a 24,000-pound plate shear to a shipbuilding works in Delaware. They also recently shipped a 42-inch punch with an engine to punch 1¼ inches through 1-inch plate. The shipment was to Vera Cruz, Mexico. They are now shipping a large 12-foot triple gear roll to handle ½-inch plate to a company in Philadelphia. The largest contract on hand at present is one for a complete outfit of shears, doublers, strap cutters and other like tools for a new rolling mill at Louisville, Ky.

The Cincinnati Milling Machine Company report a very steady and healthy condition of trade. While their shops are running full time with all the men they are able to secure, they are not pushed to the extremity of night work, for which they congratulate themselves. The outlook for a continuation of the present character of business they consider first class. In the main business is featureless, probably the most marked point being the unusually fine lot of orders coming in from New York and other Eastern points. Trade with electrical shops is good and growing, and the automobile business is fast becoming a feature in trade.

Greaves & Klusman are finding business fully equal to their capacity of production. While the great bulk of their output goes to domestic sources it is well to note that there is a steady increase in the number of foreign orders that are coming in. These are chiefly for single tools and are from very widely scattered places. Among the recent shipments of iron working tools is one of two 17-inch engine lathes to Manila. They are increasing their capacity by the addition of a number of new tools and have recently purchased four for installment in their shop. The firm are one of the few concerns here who divide their energies between wood working and iron working machines, and they are finding their wood working trade also very good and pretty generally distributed over the United States, with but few orders for export.

Smith & Mills, manufacturers of shapers, are spreading out by the equipment of an additional floor in the building which they have been occupying. This will give them an increase of about 25 per cent. in capacity. They have already ordered most of the equipment for the new floor space and expect the tools purchased to come in some time during August and September. Trade in general is excellent, and foreign orders aggregate quite a fair percentage of the whole.

Schumacher & Boye are filling quite a number of orders coming in from foreign sources, mainly for single machines for points outside of the European centers, these aggregating quite a respectable total. Trade in general appears healthy and the prospect for a continuation of the present conditions appears good. They find it very easy to sell their entire output without recourse to special drumming methods. Orders for heavy lathes predominate.

The Rahn-Mayer-Carpenter Company report but little out of the ordinary in trade. Business is excellent, the present inquiry good and the prospects for a continuation all that they could ask for. They are having a very good demand for their standard lathes and have no trouble in selling all they can produce.

The Block & Pollak Iron Company are preparing to make some extensive additions and improvements to their already capacious plant at Steelton, this county. The plan includes several additions to the forge shop and a change of quite a good part of their machinery with the view of handling heavier stuff. Among the new machines to be installed will be a 15-ton hammer, calculated to forge up to 15 inches in diameter and to handle forgings up to 50 tons weight. When this hammer is installed it will be the largest of its kind in this section of the country. They are also adding quite a number of heavy boring and turning machines in the machine shop.

The Blymyer Iron Works Company have recently booked a very nice contract, aggregating between $18,000 and $20,000 in value, for a complete sugar cane alcohol plant to be erected by the Toloso Coffee & Rubber Company of Indianapolis on their plantation on the Isthmus of Tehuantepec. They also report quite a good and regular trade in sugar, coffee and rice machines with the Philippines. General trade with Mexico they are finding first class. Brazil and the west coast of South Africa are also proving excellent customers at this time, and, on the whole, the outlook for good fall trade was never better than it is to-day.

The Queen City Brass & Iron Works Company report quite an extensive and growing demand for their valves, their present business being the largest in the history of the concern. From the amount of orders they are receiving from engine builders all over the land it would appear that that branch of trade is more than usually brilliant. Their trade in steam fitters' and plumbers' supplies is also good for this time and the outlook is considered first class.

During the last week in June the extensive plant of the

Miller, Du Brul & Peters Company, manufacturers of cigar making machinery, was visited by quite a serious fire. The loss has been adjusted by the insurance company on a basis of about $30,000 against a value of $150,00 involved. The particular point which makes this fire interesting to the iron working trade at large is the fact that Ernest F. Du Brul, the vice-president of the company, is also vice-president of the National Metal Trades Association and acting commissioner of the same. He is also secretary of the local metal trades association. The fire did more damage probably in the way of delaying business than it did actually to the property endangered, but the adjustment having been satisfactory to all parties the company are now proceeding to make up for lost time. The adjusters engaged upon the loss compliment the management very highly upon the honorable and gentlemanly treatment which they received at their hands.

In the way of new buildings Cincinnati has on hand now the steel construction edifice, for which the excavation is now being made, for the Cincinnati Traction Company, mention of which has previously been made in these columns M. E. Ingalls, president of the Big Four Railroad Company, is also preparing for the erection of a 16-story steel construction building, to cover a lot 50 x 100 feet on the northeast corner of Fourth and Vine streets. Work on this building has progressed only to the tearing down of the old buildings which occupied the site. The Third National Bank of Cincinnati is also preparing to put up a large and handsome bank building on the north side of Fourth street, between Vine and Race. While this building is only to be two stories in hight, it will call for quite an investment in the way of iron and steel construction and fittings.

The Big Four Railroad Company expect at a date not far remote to commence the erection of a tall building on the northwest corner of Fourth and Vine streets, so altogether work in this line is not exactly at a standstill in this city.

Boston Machinery Market.

BOSTON, MASS., July 19, 1902.

With very few exceptions, the local dealers in machinery, both new and old, report that business is quiet, with indications that it will continue in that condition for the next six or eight weeks. One dealer said that people had been making money during the past year, and they had now gone to the seashore or mountains to enjoy it. He predicted their return early in the fall, ready to begin a lively winter, when the machinery market would receive an impetus which would be all the stronger on account of the summer's rest. Some of the second-hand dealers expressed relief at the cessation of business activity, as it gave them time to breathe and a chance to get their stocks in shape for the winter's business. One dealer reported an increasing demand for electrically driven small tools. He said that machinists who use incandescent electric lights had found this class of tools very convenient, and their popularity was quite rapidly increasing. It is the concensus of opinion that the outlook is decidedly encouraging. There has been quite a demand for small engines, and there is beginning to be a demand for pumps for the Pennsylvania coal region. It is thought that the coal operators are expecting the end of the strike, and are preparing for active operations as soon as the labor trouble is over. Notwithstanding the reported quietness, business is considered seasonably good, the quiet being comparative.

There is some complaint over the inability to obtain promptly small orders from the factories, owing to the latter being somewhat behind with their large orders. Some dealers in tools say that they have lost sales from this cause. One prominent firm is buying no new goods, confining its attention to second-hand machinery, and one of its members expressed the opinion that there was a possibility that this procedure might be regretted in the early fall, as it was not at all unlikely that there would be a good demand for new machinery at that time. In some quarters it is thought that the check in the demand for tools was largely due to the advance in prices, but there is a hope that the advance will not be carried to an unreasonable point, and that former mistakes in that direction will be avoided.

An instance of the prevalence of good conditions is shown in the fact that the George F. Blake Mfg. Company have recently started an all night gang in their machine department.

The United Shoe Machinery Company have purchased the T. A. Norris Machine Company, who have been manufacturing shoe machinery for 17 years.

The recent launching of the seven-masted schooner "Thomas W. Lawson" at the Fore River Ship & Engine Company's works was an event of much interest in this vicinity. The schooner contained approximately 2300 tons of steel.

The Haverhill & Southern New Hampshire, the Lawrence & Methuen and the Worcester & Holden street railway companies are preparing to build electric railways. The two companies first named have received permission to issue stock, the proceeds of which are to be used in construction and equipment.

The New York Machinery Market.

NEW YORK, July 23, 1902.

Interest is still centered in the machine tool trade. The recent advances made by builders of machine tools have attracted the attention of the entire trade and there is no doubt that machinery merchants and builders in general have been encouraged to maintain firmer values by the success of the machine tool trade. The market now shows a decidedly better tone and it is very evident that purchasers are taking a more liberal view than at the beginning of the upward movement of prices. Orders have been placed more freely during the last week, and, looking back over the month of July, merchants declare that if present business continues the total for the month will eclipse June by a fair margin. The machine tool builders are still pretty well booked ahead with orders; sufficiently at least to tide them over the remainder of the summer. With an increased fall trade the prospects for a steady market at higher prices are held to be exceedingly favorable.

In connection with the action taken by the builders of drill presses, planers and shapers at Niagara Falls last week, as noted in these columns, several notifications of advances have already been sent out in the trade. As with the lathe builders, the matter of adjusting the price-lists of the various builders was entrusted to a committee. Some of the builders agreed to a straight 10 per cent. advance immediately. Others, who had previously advanced their prices left the matter to the committee, the extent of the increase to be determined upon later. Some of the planer builders advanced from 5 to 10 per cent., but most of the drill press and shaper builders decided to increase their prices 10 per cent.

The meeting was a most satisfactory one from every standpoint. Rivals who had guarded most jealously as business secrets everything regarding their prices, discussed each others' price-lists, and almost all were surprised at the freedom displayed by each other in discussing this important topic. In commenting upon the benefits to be derived from such meetings, one builder said: "There's Mr. ——, why during the last 15 hours I've become better acquainted with him than I had during the last 15 years staying at home." Both men are engaged in the same line in the same city. It was this feeling that induced the drill press, planer and shaper builders to join hands with the lathe and radial drill builders in the National Machine Tool Builders' Association. We are informed that this organization now has a very good membership, and has awakened considerable interest in the trade throughout the country. Following is the constitution of the associoation in full:

ARTICLE I.

This association shall be known as the National Machine Tool Builders' Association.

ARTICLE II.

The objects of this association are to promote the interests of the machine tool builders in the direction of good fellowship and the liberal discussion of subjects pertaining to the manufacture and sale of machine tools.

ARTICLE III.

Section 1. Members of this association shall be persons, firms or corporations engaged as principals, owning or controlling manufacturing plants, operating exclusively in the manufacture of machine tools.

Sec. 2. Applicants for membership under Section 1, Article III, shall be recommended by at least one member in good standing, and shall be admitted to membership when elected by the majority vote of the members of the association.

Sec. 3. Resignations of members shall be tendered to the secretary of the association in writing, and shall be accepted only when said members' dues are fully paid.

Sec. 4. A member may be expelled only by a three-fourths vote of the association.

Sec. 5. Each member shall be entitled to one vote. Where corporations are represented by more than one member said corporation is entitled to one vote only.

ARTICLE IV.

Section 1. There shall be an annual national convention held in the month of October, at such time and place as the association shall appoint.

Sec. 2. The convention shall be composed of duly accredited representatives of members in good standing. Members may be represented by proxy, but said proxy must be a member of the association.

Sec. 3. The annual convention shall elect national officers by ballot as follows: President, first vice-president, second vice-president, secretary and treasurer, who shall be elected for a term of one year, or until their successors are qualified.

Sec. 4. Special conventions may be called by the president at the written request of eight members of the association.

Sec. 5. Fifty per cent. of the votes of the association shall constitute a quorum of the convention.

Sec. 6. The five above enumerated officers shall constitute the Executive Committee.

Sec. 7. The association at its national conventions shall make such laws, define such policy, adopt such resolutions and render such decisions as shall further the interests of the association, and the acts, resolutions and decisions of a national convention shall be final and binding upon all members.

ARTICLE V.

Section 1. This constitution may be amended by a two-thirds vote of the association members in national convention assembled.

Article I of the by-laws states in Section 1: "The initiation fee shall consist of the payment of the sum of $25, being the amount of the first annual dues, and $25 yearly thereafter, payable in advance."

Last week we referred to a large machine shop to be built in New Jersey. We are informed that this plant is to be erected for Pedrick & Ayer of Philadelphia, who are controlled by Manning, Maxwell & Moore of New York. The new works are to be built at Plainfield, N. J. Milliken Brothers of New York have the contract for the iron work. The buildings will all be of the steel skeleton type, with brick walls. There is to be a machine shop about 100 x 500 feet, a power station 40 x 100 feet, blacksmith shop 40 x 100 feet, pattern storage building 50 x 100 feet and two stories high.

The American Railway Switch Company, a new corporation, with a paid up capital stock of $500,000, will erect a plant at Depew, N. Y. It is expected that work will be begun on the buildings within a month. The company will engage in the manufacture and sale of frogs, crossings, switches, curved rails, castings and special track work of every description for use on railroads and street railways.

The officers of the company are: George A. Ricker of Buffalo, president and general manager; Gen. George Moore Smith, vice-president; H. W. Sprague, second vice-president and sales manager; T. J. Madden, secretary; A. F. McLeod, treasurer; John H. Post, assistant treasurer. Mr. Ricker is an engineer with considerable experience in railroad work, and he will have direct charge of the erection and equipment of the company's plant. His address is 702 Ellicott square, Buffalo.

The directors of the corporation are: E. S. Goodrich of Hartford, Conn.; William E. Seeley of Bridgeport, Conn.; George A. Lund of New Haven, Conn.; George M. Stowe of Buffalo, George A. Ricker of Buffalo, William B. Franklin of New York, Gen. George Moore Smith of New York, H. A. Stearns of Rhode Island, H. N. Atwood of Boston, Benjamin F. Peach, Jr., of Boston, Henry W. Sprague of Boston, and Franklin Bartlett of New York.

The Stamford Engine & Machine Works, recently incorporated with a capital of $250,000, of which $50,000 is preferred stock, have absorbed the Crescent Machine Works of Stamford, Conn., and will re-equip the plant for the production of a new gasoline engine. The engine is to be used principally for automobile and launch work. Wm. F. Ellis is the president of the company and Morgan V. Lawson is the treasurer, with offices at 25 Pine street, New York.

The National Lead Company of 100 William street, New York, are about to build a large addition to their Brooklyn plant. The contract for the steel work on a building 40 x 160 feet and four stories high has just been awarded to Milliken Bros. of 11 Broadway.

The Buffalo Forge Company, whose New York office is located at 39-41 Cortlandt street, just closed a contract with the Brooklyn Edison Company for a forced draft system, consisting principally of three 10-foot steel plate fans direct connected to center crank engines. They also secured the order for the heating plant to be installed at the new plant of the Sackett & Wilhelms Company at Grand street and Metropolitan avenue, Brooklyn. This equipment includes two steel plate fans with 10-foot blast wheels direct connected to horizontal engines and about 20,000 feet of heater casts.

New York.

NEW YORK, July 23, 1902.

Pig Iron.—The Anthracite Coal miners' strike is causing increasing trouble among Eastern foundrymen. They have contracted for all the Iron needed this year, but cannot get it, as the furnaces are running so irregularly, which not only reduces their product but often causes the quality to be much under contract grade. Numerous foundrymen are therefore depending on Scotch, English and German Iron to keep them running. Some sales of domestic Iron are reported for next year, one contract having been made for 3000 tons, March to September. The disposition to order so far ahead is not so strong in the East as in the West. Southern furnace companies have agreed on the basis of $17. Birmingham, for No. 2 Foundry for the first six months of 1903. Prices of both Northern and Southern Iron are much higher for anything like early delivery than for next year's shipment. Consumers in distress for stock have been known to pay $25 or more for No. 2 Foundry the past week. For 1903 the following quotations are made: Northern Iron, at tidewater, No. 1 X, $23.50 to $25; No. 2 X, $22.75 to $23.50; No. 2 Plain, $22.25 to $22.50. Tennessee and Alabama brands are quoted as follows: No. 1 Foundry, $22.50 to $23.50; No. 2 Foundry, $21.75 to $22.50; No. 3 Foundry, $21.25 to $21.75.

Cast Iron Pipe.—Manufacturers are losing a great deal of business because they are unable to make definite promises as to deliveries, due to the difficulty experienced in securing Pig Iron. Some large foundries are running only half time for this reason. The tonnage offering is large in volume, although not including many heavy single quantities.

Steel Rails.—More orders have been placed for next year and the tonnage thus received is now well over 1,000,000 tons. Prices are unchanged at $28, Eastern mill.

Finished Iron and Steel.—Manufacturers of Structural Material continue very busy. Some heavy contracts are under negotiation, which may be closed this week. Beams are being imported in increasing quantities at about 2.15c., ex-ship, for prompt delivery. We quote at tidewater as follows, but must add that for small lots and prompt delivery much higher prices are being obtained for Structural Material and for Plates: Beams, Channels and Zees, 2c. to 2.25c.; Angles, 2c. to 2.25c.; Tees, 2c. to 2.25c.; Bulb Angles and Deck Beams, 2.10c. to 2.25c.; Sheared Steel Plates are 2c. to 2.10c. for Tank, 2.10c. to 2.20c. for Flange, 2.25c. to 2.40c. for Fire Box. Refined Bars are 1.95c. to 2c.; Soft Steel Bars, 1.95c. to 2.05c.

Metal Market.

NEW YORK, July 23, 1902.

Pig Tin.—The market has been quiet, with prices declining gradually. Business has been slight, only the smaller consumers buying, and they from hand to mouth. Arrivals so far this month amount to 1507 tons, and afloats aggregate 3368 tons. Within the next two weeks heavy arrivals are expected. Four direct steamers from the Straits will be due with about 500 tons in addition, picked up at London and Holland. Closing prices to-day were as follows: Spot, 28.25c. to 28.50c.; July, 28.30c. to 28.35c.; August, 27.75c. to 28.25c.; September, 27.50c. to 28c.; October, 27.25c. to 27.75c. London closed £128 for spot, and £125 12s. 6d. for futures.

Copper.—There has been a continued weakness, and prices are a shade lower than last week. Some of the lake producers have entered the market, and sold this and next month's delivery at 12c. Yesterday 100,000 lbs. of August Lake was sold on the Exchange at this figure. There are still sellers in the market at this price, but no buyers. The situation is considered in buyers' favor, as production is large, imports, especially from Mexico, are large, and exports are on the decrease. Thus far this month the exports amount to but 6700 tons. Quotation, for delivery spot to October are as follows: Lake, 11.75c. to 12c.; Electrolytic, 11.75c. to 11.90c.; Casting, 11.75c. to 11.85c.; Standard, 11.37½c. to 11.60c. Throughout the week the London market has been quiet, with a downward tendency. Spot closed at £52 13s. 9d., and futures £52 16s. 3d. Best Selected declined 10s. to £57 10s.

Pig Lead—Is unchanged in this market. The Smelting & Refining Company quote 4.12½c. for spot and 4.10c., 15 days. London declined to £11 2s. 6d., but recovered to-day to £11 5s., which was the closing price last week.

Spelter—Is still very strong and advancing. Spot is now quoted here 5.37½c., and St. Louis quotes 5.10c. In London the market declined 5s. since last week, closinb £19. It is reported that officials of the American Smelting & Refining Company are negotiating for the acquisition of the Clark-Coolidge Zinc and Lead properties in Missouri. No significance is attached to the report in the trade. Even should they acquire these properties they are of so small importance that the situation would remain unchanged.

Antimony—Is unchanged. Hallett's is quoted at 8.25c. and Cookson's remains unchanged at 10.25c. Other brands are quoted 8c.

Nickel—Is unchanged; ton lots are quoted at 50c.

Quicksilver.—Prices are on a basis of $48 per flask of 76½ lbs. in lots of 50 flasks or more.

Tin Plates.—The market is unchanged. The American Tin Plate Company are quoting for delivery until October 1 on a basis of $4.19 per box of standard 100-lb. Cokes, f.o.b. New York, or $4 f.o.b. Pittsburgh. Quotations from Swansea show an advance of 1½ pence to 13 shillings 4½ pence.

Request for Catalogues.—M. H. Treadwell & Co., 95-97 Liberty street, New York, have recently moved their estimating department to their Lebanon, Pa., works, where they would be pleased to receive a full line of catalogues, illustrated circulars and price-lists relating to engineering, foundry or anything in the way of special machinery.

Interesting Commercial Literature.

LONDON, July 8, 1902.—One of the most striking features of modern commerce, illustrating at once its great complexity and its simplicity, is the tendency to write books on purely commercial subjects. The old fashioned trade report is too meager; the manufacturer or exporter wants something more explicit. The various Government publications, into which we have to dig deep before finding what we want, serve a certain purpose, but busy men have little time to waste on intricate searches through columns of figures. Something authoritative, however is always gladly welcomed. This general idea seems to have been the motive of Harper & Brothers, the well-known publishers of New York and London, in issuing their International Commerce Series, edited by Francis W. Hirst. This series consists of books on the commerce of many nations, each written by a recognized authority. Six books have thus far been issued: "The United Kingdom and Its Trade," by Harold Cox; "Japan and Its Trade," by J. Morris; "British India and Its Trade," by H. J. Tozer; "The United States and Its Trade," by Henry Loomis Nelson; "Germany and Its Trade," by J. G. Ambrose Pogson; "Holland and Its Trade," by F. A. Chambers. I have been looking through the two volumes on India and Japan. They seem to me worth the study of any American exporter desiring to cultivate trade in the Orient. The book on British India covers only 80 pages; that on Japan is more ambitious, running to 178 pages. Taken together, they constitute a very fair index to the trade of the Orient, for it must be remembered that these two countries are in most respects commercially the best developed. China opens up problems separate and distinct from the others.

The Trade of British India.

H. J. Tozer writes on British India and has some information to impart. He tells us about the physical features and population; the difficulties created by race, caste, religion and language. There is a useful little synopsis on the occupations of the Indian population. From this I glean that 61 per cent. of the people depend directly upon agriculture for their livelihood. It is, of course, well known that the Indian ryot, while hard working, has to live on a singularly poor subsistence. It is *petite culture*, and consequently there is a very sparce demand for agricultural implements. A number of the artisans of the villages—smiths, shoemakers, weavers, potters—also depend in part upon the cultivation of their small holdings. In a Government return I find that there are 1,437,739 persons depending for their living upon the construction of buildings, 146,508 on the construction of vehicles and vessels, 3,821,433 on the provision of metals and precious stones, 2,360,623 on pottery and stone ware, 4,685,579 on commerce and 3,952,993 on transport and storage. It will thus be seen that notwithstanding the poverty of India—a grinding, cruel poverty—there is the making of a vast middle class with great potential purchasing capacity. As nearly as I can ascertain from various authorities, it would seem that in India the rich grow richer and the poor rapidly become poverty stricken. It is the rich and the middle class trader, who depend upon the rich, whom American exporters must cultivate. In the year 1900-1901 the imports of India were valued at $351,570,000, and the exports at $406,635,000, a total foreign trade of $758,205,000. That America has as yet hardly begun to sell to India is shown in the comparative returns. Thus India in 1900-1 purchased goods from Great Britain valued at £32,451,000, from the United States the sum total was only £833.000. Yet India sold to America last year goods valued at £4,165,000. The following were the chief metal imports for the last two years:

	1899-1900.	1900-1901.
Iron, tons	149,097	169,992
Steel, tons	72,636	92,992
Brass, cwt.	10,196	11,899
Copper, cwts.	90,846	159,971
Zinc	77,080	71,572
Tin, cwts.	17,401	22,741
Lead	103,249	122,264

The value of imported hardware, cutlery and implements purchased last year by India amounted to $6,140,000—the largest amount on record, being an advance of over $800,000 on the previous best year. While iron is the most important metal imported, it is fast being replaced by steel, particularly the cheaper and commoner kinds used in hooping cotton bales, &c. The substitution of ready made tools and implements for the rough native ones formerly made in imported iron, also accounts for the rapid growth of steel at the expense of iron. The iron chiefly imported is in pig, sheets and plates, galvanized and tinned, bars, pipes and tubes, nails, screws, rivets and washers, wire and angle, bolt and rod. Steel takes the form of bars, plates and sheets, beams, pillars, girders, bridgework and hoops. In the supply of iron and steel Belgium has broken down the practical monopoly in the heavy metal trades once held by Great Britain, mainly on account of cheapness. Austria-Hungary monopolizes the trade in enameled iron ware. The copper is imported for the manufacture of domestic and other utensils. Lead is, of course, imported for tea chests. The great extension of railway construction, coupled with the constant need of repairs and renewals, has led to a large demand for all kinds of railway stores. Most of the railroads are in the hands of the Indian Government. This means security of credit, but it also means a strong disposition to buy from Great Britain. America has got in occasionally on steel rails and locomotives, the orders turning on price and quick delivery.

How to Get Indian Trade.

H. J. Tozer confirms my previously expressed opinion that the best way to capture Indian trade is by the establishment of local branches or by the appointment of local agents, who can devote themselves specially to pushing trade. Experience proves that it is almost impossible for foreign merchants to trade direct with native buyers. About a year ago I gave a specimen in *The Iron Age* of the class of cunning correspondence inevitable when trade is attempted from overseas. Trade is mainly carried on by commission agents, who send their indents to Europe or America. It is, of course, quite impossible to appoint local agents everywhere, but they should be found in the chief Indian ports and in such inland marts as Delhi and Cawnpore. The great thing is to get into touch with the rich native merchants in the bazaars. Commercial travelers are of little or no use in India. To begin with, the climate is against them. They can only travel during the cold season, November to March. Travelers also, to do any trade, must be thoroughly acquainted with the habits and language of their possible customers. The Indian habit of bargaining is almost a complete bar; it needs many years' experience to equal the Indian buyer in wiliness. The English language can generally make itself understood, but it is a great advantage to know Hindustani. Further information can be obtained at small cost from the secretaries of the Chambers of Commerce in Calcutta, Bombay, Karachi, Madras, Rangoon and Cochin. Cheapness is the great desideratum. Large quantities of hardware, cutlery, glass and glass ware are bought from Europe because of their low price. Good packing is essential on account of great variations in climate, damp and vermin. Hardware and cutlery cannot stand long storage on this account, so that constant and regular supplies are essential. Machinery should be imported during the dry season. There is a duty of 5 per cent. ad valorem on hardware and cutlery, including ironmongery and plated ware, machine tools, implements worked by hand or animal power (with certain exceptions). The duty on metals wrought and unwrought is also 5 per cent. ad valorem.

The Trade of Japan.

With a population exceeding 46,000,000, and an average density of 288 per mile, with the people much more interested in commerce than in politics and their wants growing in consequence, it follows that every exporting nation should try to ascertain exactly what Japan can buy. My attention was first directed to Japan some four years ago when in New York, by being shown a price-list in Japanese by a prominent American file manufacturer. It was at once evident that if it paid this enterprising gentleman to design a catalogue in Japanese

characters, Japan was worth closer attention than I had hitherto given it. I therefore regard this book on "Japan and Its Trade," by J. Morris, as being both useful and timely. There are 48 to 50 cities in Japan with a population exceeding 30,000. There are six or eight cities exceeding 100,000—Tokio (1,180,569), Osaka (479,546), Kioto (308,266), Nagoya (185,776), Kobe (148,625), Yokohama (143,754). The cities of Kanazawa and Hiroshima verge on the 100,000 limit. There are nearly 1300 resident Americans in Japan. The following figures show the extent of Japan's foreign trade:

	Exports.		Imports.	
	Total.	Per head.	Total.	Per head.
1890	$28,000,000	$0.68	$41,000,000	$0.98
1895	68,000,000	1.48	69,000,000	1.58
1899	107,000,000	2.20	110,000,000	2.40

The foregoing table indicates a gradual rise in the standard of living in Japan. It necessarily follows that heavier purchases from foreign countries are likely to increase, notwithstanding numerous obstacles. As showing the trend of Japan's import trade, I extract the proportion of trade done by various countries in metals and allied goods:

		Per cent.
Railroad cars	Great Britain	95
Bar and rod iron	Belgium	30
" " "	Great Britain	30
Nails	United States	70
"	Germany	27
Plates and sheets	Great Britain	72
" "	Belgium	22
Pig iron	Great Britain	70
" "	China	16
" "	United States	7
Pipes and tubes	Great Britain	60
" " "	United States	26
" " "	Belgium	12
Ironware	Germany	90
Lead	Australia	62
"	United States	30
Locomotives	Great Britain	52
"	United States	43
"	Switzerland	3
Spinning machinery	Great Britain	94
Weaving machinery	Great Britain	90
Boilers, engines, &c	Great Britain	48
" "	Germany	30
" "	United States	8
Rails	United States	55
"	Great Britain	40
Steel	Great Britain	82
Telegraph wire	Great Britain	95
Zinc sheet	Germany	72

It will thus be seen what a grip Great Britain has upon the Japanese market. There is evidently room for greatly increased American activity. Of course, much depends upon Americans acquiring much greater shipping facilities. Still, looking to the extent of the American trade in nails, tubes, lead, boilers, rails and other goods, it is not unreasonable to assume that greater expansion is possible under present maritime conditions. A more detailed statement of Japan's actual purchases in metal goods may be worth record for future reference:

Plates and Sheets.

	Belgium.	Germany.	Great Britain.	Other countries.
1897	$68,000	$24,000	$455,000	$670
1898	90,000	31,000	540,000	40,000
1899	257,000	48,000	772,000	31,000

Pig Iron.

	Germany.	Great Britain.	United States.	China.	Other countries.
1897	$38,000	$398,000	$29,000	.....	$285
1898	36,000	524,000	113,000	$9,000	6,000
1899	21,000	342,000	31,000	73,000	13,000

Bar and Rod Iron.

	Belgium.	Germany.	Great Britain.	Sweden and Norway.	United States.
1898	$827,000	$229,000	$912,000	$10,000	$26,000
1899	782,000	98,000	390,000	8,000	11,000
1900	1,275,000	386,000	946,000	?	27,000

Nails.

	Belgium.	France.	Germany.	Great Britain.	United States.
1897	$29,000	$2,000	$211,000	$16,000	$469,000
1898	6,000	440	65,000	13,000	488,000
1899	3,000	....	328,000	30,000	723,000

Rails.

	Belgium.	Germany.	Great Britain.	United States.
1897	$146,000	$85,000	$813,000	$617,000
1898	37,000	67,000	400,000	804,000
1899	12,000	1,000	85,000	114,000
1900	63,000	26,000	462,000	1,613,000

Pipes and Tubes.

	Belgium.	Germany.	Great Britain.	United States.
1897	$58,000	.....	$339,000	$47,000
1898	107,000	$11,000	367,000	119,000
1899	66,000	.....	278,000	130,000

That the machinery for doing business with Japan is already "in being" may be judged by naming some of the foreign firms already established:

In Yokohama: American Trading Company, New York.
China & Japan Trading Company.
Cornes & Co. (London).
Dodwell & Co., Limited (London), also at Vancouver, Seattle, Tacoma and Portland (Oregon).
Fraser, Farley & Co. (Boston).
Frazar & Co. (New York).
R. Isaacs & Brother (New York).
Japan Import & Export Commission Company (New York and London).
Geo. H. Macy & Co. (New York: Carter, Macy & Co.).
Mendelson Brothers (San Francisco).
A. S. Rosenthal & Co. (New York).
Samuel Samuel & Co. (London).
Vivanti Brothers (New York).
Walsh, Hall & Co. (New York).
In Kobe: Averill Olmsted & Co. (New York).
Boyes & Co. (Europe).
McKay & Co. (New York).
Pollak Brothers (New York and London).
S. Reich & Co. (New York).
E. D. Sassoon & Co. (London and Bombay).

S. G. H.

St. Lawrence River Power Company.

A definite step in the reorganization of the St. Lawrence Power Company has been taken by the organization of a new company to take over the leases and contracts of the old company. The new concern is styled the St. Lawrence River Power Company. They were incorporated with a capital of $7,000,000. The directors are: Henry P. Davison of Englewood, N. J.; Mark T. Cox, East Orange, N. J.; Samuel E. Potter, Wm. J. Wilson, New York, and Thomas A. Gillespie, Massena

Mr. Cox of East Orange, one of the directors of the new company, was the purchaser of the power company at the mortgage foreclosure sale at Massena on July 3. He was also a member of the Reorganization Committee of the first and second mortgage bond holders of the company, who recently went into insolvency.

The new company will continue the operation of the plant at Massena. The new plant of the Pittsburgh Reduction Company is now under construction at Massena, and owing to the heavy demand for aluminum which exists at present every effort will be made to complete the works as soon as possible. As soon as the mills now building are completed it is intended to increase their scope considerably, and it is also contemplated to erect factories for turning out manufactured articles of aluminum.

The New York offices of the St. Lawrence River Power Company, which are located at 135 Broadway, are negotiating with a number of large concerns looking toward their location at Massena.

The American Boiler Manufacturers' Association, now in session at Atlantic City, have elected the following officers: President, James O'Brien, St. Louis; vice-presidents, I. Robert Monroe, Jr., Columbus; Samuel Borger, Columbus; J. M. Robertson, Boston; Y. M. F. Cole, Newnan, Ga., and J. F. Casey, Chattanooga; secretary, J. D. Farasey, Cleveland; treasurer, Joseph Waugler, St. Louis.

It is reported that the Morris & Bailey Steel Company, Pittsburgh, Pa., will during the present week withdraw from the Cold Rolled Steel Strip Association.

St. Louis.

CHEMICAL BUILDING, July 23, 1902.—(*By Telegraph.*)

Pig Iron.—The situation seems to be without new features of importance. Some considerable inquiry for Iron for 1903 delivery is coming to hand and quotations for the first six months range from $17 to $18.50, Birmingham, for No. 2 Foundry Freight rate to St. Louis is $3.25. We quote for cash, f.o.b. St. Louis:

Southern, No. 1 Foundry	$21.50 to $23.50
Southern, No. 2 Foundry	20.75 to 22.75
Southern, No. 3 Foundry	20.25 to 22.25
Southern, No. 4 Foundry	19.75 to 21.75
No. 1 Soft	21.25 to 23.25
No. 2 Soft	20.75 to 22.75
Gray Forge	19.75 to 21.75

Bars.—The demand for Iron and Steel Bars continues in very fair volume and the jobbing trade express satisfaction with prevailing conditions. We quote from the mills Iron Bars at 1.90c.; Steel Bars, 1.90c. to 2c. Jobbers quote Iron Bars at 2.25c.; Steel Bars at 2.25c., full extras.

Rails and Track Supplies.—The market for Rails and Track Supplies continues as recently reported. We quote Splice Bars at 2.10c. to 2.15c.; Bolts, Square Nuts, 3c. to 3.10c.; with Hexagon Nuts, 3.25c. to 3.30c.; Spikes, 2.50c. to 2.60c.

Sheets.—A very good demand is found for all grades and sizes of Sheets and prices in general hold firm.

Spelter.—The active call for Spelter continues and prices have reached a higher level. Quotations for futures as far distant as September are named from 5.10c. to 5.12½c.

Iron and Industrial Stocks.

The stock market has shown greatly increased activity and advancing prices during the past week. Railroad stocks received chief attention, but industrials also were in greater favor than for some time. Fuller Construction Company made the greatest advance, based on the announcement of an extension of the business into a supposedly much more profitable field. United States Steel also moved up as a result of the showing made by President Schwab. Pennsylvania Steel also made quite a movement upward.

By way of Boston the report has been published that the forthcoming statement of earnings of the Republic Iron & Steel Company for the fiscal year ended June 30 will make a very favorable showing. It is said that the report will show a surplus after preferred dividends of not far from $2,000,000, or within $250,000 of the surplus shown during the first 14 months of operation.

The contest for the control of the Colorado Fuel & Iron Company is on in earnest. The company have mailed notices to their stockholders of the annual meeting of the company to be held at their office in the Boston Building, Denver, Col., on Wednesday, August 20 next, at 3 o'clock. Harris, Gates & Co. are asking for proxies to use at this meeting, and have applied to the courts for an order to compel the Knickerbocker Trust Company, transfer agents of the Colorado Fuel & Iron Company, to furnish the firm with a list of the stockholders. John W. Gates and James Blair, directors in the Colorado Fuel & Iron Company, unite with Harris, Gates & Co. in the application.

For the first four months of the new fiscal year of the General Electric Company net earnings above expenses amounted to $2,793,924, or at the average rate of $700,000 per month. As the company are sold ahead, it is said to be reasonable to expect net earnings for the current fiscal year of at least $7,500,000. Applying the capital stock as increased ($42,031,600) to these estimated earnings the new stock is found to be earning at the rate of 18 per cent. per annum.

The Tennessee Coal & Iron Company have issued the following statement of earnings of the company for the quarter and half year ended June 30:

	Quarter.	Half year.
Gross profits from operation	$655,966	$1,234,981
Fixed charges	181,547	392,202
Net profits	$474,419	$842,779
Sinking and replacement funds	114,668	233,001
Balance applicable to dividends	$359,751	$609,778
Dividends on preferred stock at 8 per cent. per annum	8,277	13,243
Surplus	$351,474	$596,535

The surplus of $596,535 reported for the half year is equal to about 3 per cent. on the common stock or at the rate of 6 per cent. per annum.

Negotiations are now in progress looking to an amalgamation of the Pressed Steel Car Company and the American Car & Foundry Company, and those interested in the consolidation believe that their efforts will be successful.

Within a week it is expected that the Pressed Steel Car Company of Pittsburgh will declare the usual quarterly dividends of 1¾ per cent. on the preferred stock, and 1 per cent. on the common stock. It is said the statement to be submitted to the stockholders for the six months ending June 30 last will show 11 per cent. earned on the common stock, or 22 per cent for the year.

Dividends.—The Amalgamated Copper Company have declared a dividend for the quarter of one-half of 1 per cent., payable August 25.

The American Typefounders' Company have declared the first dividend on their preferred stock of 1¾ per cent., and the regular quarterly dividend of 1 per cent. on their common stock, both payable July 19.

The Cambria Steel Company have declared the regular semiannual dividend of 1½ per cent.

The Montana Ore Purchasing Company, of which 95 per cent. is owned by the United Copper Company, declared yesterday their dividend, No. 35, of $2 per share, making a total paid to date of $2,482,000.

Proposed Tube Mills at McKeesport.

For some months officials of the National Tube Company have desired to acquire a large site of land at McKeesport, lying between the present National Tube Works and the rolling mills of the Monogahela Steel Works. The parties who owned this land refused to accept a fair price for it, and the officials of the National Tube Company had practically dropped the matter and were making plans to build another tube mill at another point. The business interests of McKeesport then took the matter up and agreed to secure the land at a price fixed by the National Tube Company and the latter agreed to take the property if it was secured at the figures they offered for it. This company have succeeded in getting all the ground at the desired figures, with the exception of two parcels, and the National Tube Company will treat with the owners of these two parcels of property themselves. The ground comprises 28 acres and will be used by the National Tube Company in the building of large tube and other mills and also in extensive additions to their present plant. No definite announcement has been made as to the details of the plant to be built, nor will it be until certain matters now pending have been adjusted.

The Clearfield Steel & Iron Company.—The Clearfield Steel & Iron Company have been formed by Charles and H. L. W. Hyde of Hyde Brothers & Co. of Pittsburgh, and contracts have been awarded for the construction of puddling furnaces and rail re-rolling mills. The plant will be located at Clearfield, Pa., and the company expect to begin operations within three or four months. The contract for the buildings, which will be of steel, has been awarded to the Fort Pitt Bridge Company. It is the intention to erect 24 puddling furnaces with a capacity of 50 tons of iron and sufficient scrap will be re-rolled to make the daily tonnage 100 tons. It is also the intention to re-roll steel rails into lighter sections, the capacity for this work being about 50 tons a day.

It is reported in Pittsburgh that Theodore Shaffer, president of the Amalgamated Association of Iron, Steel and Tin Plate Workers, said that the majority of the lodges of tin plateworkers had voted in favor of the proposition suggested at the recent conference between the officials of the American Tin Plate Company and the Amalgamated Association. This proposition provides that the men accept a 25 per cent. reduction in wages from the present scale on certain work. By thus lessening the cost of production, it is expected to retain in this country the business of the Standard Oil Company, who consume about 1,500,000 boxes of tin plates, and which at present are imported from Wales. As these plates are for making cases used in shipping oil abroad they are almost duty free under the drawback clause of the tariff. As the present rate of consumption in this country is not equal to the productive capacity of the mills, the officers of the American Tin Plate Company and the Amalgamated Association alike are desirous of manufacturing at least a portion of the 1,500,000 boxes in this country so as to keep the men and mills busy at all times. The subject is now being considered by the separate lodges, but all have not voted on the matter as yet. The outcome will probably not be known until next Monday. The officials of the Amalgamated Association are heartily in favor of the plan.

HARDWARE.

THE successful merchant, like the successful manufacturer, is constantly endeavoring to enlarge his business. He must see his trade increasing. He realizes that much of his business is each year being done on a closer margin, and as the percentage of profits decreases the volume of trade must be increased. These are self evident facts, and the question of how to increase his trade without materially adding to the fixed charges of his business is one of prime importance. In the Hardware trade during the past few years, as we have before pointed out, there have grown up many small jobbers, which have been a natural outgrowth of this desire for a larger field. By economy and work and close attention to details the greater number of these firms have succeeded in building up and making a good business. But in all cases where a wholesale business of any extent is added to a retail store the expenses are very materially increased. There are, however, many lines of goods that can well be sold in the Hardware store and added to the regular stock without necessitating a larger selling force or materially increasing the expenses of the store. Trade can be worked up on such goods in the dull season. With the expense of perhaps one or two additional employees the retail business can be enlarged by adding new lines of goods.

The retailer and small jobber of Hardware can easily increase his trade and enlarge his field by taking up some kindred lines which are not now to be found in all Hardware stores. The following lines will readily suggest themselves:

Paints, Varnishes and Painters' Supplies.
Sporting Goods, including Fishing Tackle, Guns and Ammunition, Baseball, Athletic and Golf Goods, Hammocks and Photo Goods.
Electrical Goods, including Door Bells, Batteries, Dynamos and Motors.
Mill Supplies, Belting, Tools, Small Lathes, &c.
Silver Ware, comprising Plated Knives and Forks, Silver Hollow Ware and Sterling Silver Novelties.

Many merchants, too, have with very satisfactory results, taken up other lines, such as Harness, Sewing Machines and Agricultural Implements, as well as other articles which properly go with Hardware. In this matter it is obviously necessary that good judgment be used in deciding on the advisability of thus enlarging the scope of the business, and that at the same time skill and energy be put forth in making and establishing a market for the new lines. The benefit which the whole business would naturally derive from this infusion of enterprise and effort is another argument for thus broadening the field.

Carload buyers in all departments of the trade are more or less affected by the tendency in modern railroad practice toward heavier equipment, including rails, locomotives and cars. Box cars now constructed to replace worn out rolling stock have capacities ranging from 50,000 to 80,000 pounds. As railroads object to handling partly filled cars the minimum carload has been gradually increased from 25,000 to 30,000 pounds, and a further increase to a 40,000-pound minimum carload is apparently in progress, being announced by some of the railroads and by some manufacturers in heavy lines. These increases directly affect merchants and manufacturers who have been in the habit of straining a point at times to secure the advantages of lower prices and lower freight rates by placing orders with the mills for carload lots. Merchants, for example, who could handle 250 or 300 kegs of Nails, or their equivalent in Nails and Wire together, might find 400 kegs of Nails or the equivalent more of a burden than they would care to assume. The trade, however, will doubtless adjust itself quickly to the changing conditions, and with the naturally increasing volume of business of the carload buyers they will in most cases experience little difficulty in disposing of the larger quantity, and will respond to the influence of the growing capacity of the cars by increasing their distributing facilities.

Condition of Trade.

The month which is perhaps the quietest in the year, so far as general business is concerned, draws to a close without any important change in the commercial or mercantile situation. There has been no weakening of prices of such a character as to indicate any lack of strength in the market for Hardware and Iron products, and while there has been a natural letting up of the demand the volume of business has been on the whole satisfactory. Crop conditions, notwithstanding unfavorable reports from some sections, are undoubtedly on the whole such as assure great crops, which will serve as the basis of a widespread prosperity. While in the market for Hardware and related goods there is a general recognition of the existence of high prices, as viewed in the light of past experience, the absorbing power of the country and the great volume of goods which are going rapidly into consumption keep stocks all along the line down to what is in many cases an uncomfortably low level, and makes the market to have in general a decidedly strong and confident tone. Careful merchants are watching closely a few spots where weakness is expected sooner or later to develop, and in some of them there are signs that the goods are beginning to feel the effect of competition, which has been encouraged by high prices, and in some cases by the temporary control of the market, as it is called, by leading interests, or by agreements in one form or another between the manufacturers. The development of the producing capacity of the country is finding constant illustrations in the establishment of new plants or the enlargement of existing ones, so that there is scarcely a line in which the ability of the manufacturers to turn out goods has not been materially increased since the beginning of the present prosperous era. All this contributes directly to the activity of trade and the well being of the people, but has its obvious bearing on the conditions which will prevail when anything occurs to check consumption and to bring about the reaction which must be anticipated. Fortunately all the indications point to a continuance of prosperous conditions and active business during the period upon which the trade is about to enter. It is a matter of regret that high prices and the absorption of manufacturers' energies in the execution of orders for the home market are interfering seriously with the regular supply of goods called for by foreign markets. Houses in the export trade refer to this as materially diminishing the volume of business which might otherwise be done, but the ease with which American goods find foreign sale furnishes something of a compensation as increased varieties are going abroad. The next decline in price of manufactured products is awaited by those cultivating foreign business with anticipations of the great opportunity which will then be afforded for entering more aggressively and successfully than ever into the markets of the world.

Chicago.

(*By Telegraph.*)

Immediately following the settlement of the freight handlers' and teamsters' strike heavy shipments were made by local jobbers of Hardware, some being obliged to work night forces. Since that time business has resumed more normal conditions, assuming a summer character. Yet considering all, there is a fair degree of activity, especially in Shelf Hardware. One or two jobbers are already making shipments on fall orders, but the majority will not fill such contracts until August. Manufacturers of Nails and Wire note that while business has fallen off, as expected at this time of the year, there has not been the accumulation of stock anticipated. On Weaving Wire the mills are running double turns, the demand being exceedingly active and some of the smaller companies have orders booked for their entire capacity for a year. Baling Wire has been selling well, but otherwise there has been no special activity in Wire. Some shading of prices of Fence Staples are reported, but as a rule prices throughout are well maintained, better so than usual. No new features have been developed in Builders' Hardware, and no special activity is noted. Some advances are expected in prices of various specialties, but as yet manufacturers have taken no action. In Heavy Hardware the demand has continued very active, even urgent for special lines, such as Angles above 3 inches, Channels and similar Structural Material. The demand for Wagon Material has also increased rather than diminished, and a strong tone has continued to prevail.

NOTES ON PRICES.

Wire Nails.—The output of Wire Nails has been much reduced by the closing down of mills for the annual repairs and cleaning up. Demand is moderate, as is expected at this season. Deliveries from mills are delayed in some instances owing to insufficient terminal facilities of railroads, much to the annoyance of jobbers. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

To jobbers in carload lots	$2.05
To jobbers in less than carload lots	2.10
To retailers in carload lots	2.10
To retailers in less than carload lots	2.20

New York.—The store demand for small lots continues in fair volume. Quotations remain unchanged, as follows: Small lots from store, $2.30; carloads on dock, $2.18 to $2.20.

Chicago, by Telegraph.—Few orders of importance are being taken by the mills and the jobbing demand has been very light, but prices have been well maintained, even firm. Single carload lots are selling at $2.20, and small lots at $2.25 to $2.30 from store.

Pittsburgh.—Demand for Wire Nails is mostly for small lots and some unevenness in prices in certain sections of the country still exists. A good many of the Nail mills remain closed, which has curtailed the output very much, but there still seems to be some accumulation of Nails. We quote Wire Nails at $2.05 in carloads, but note that this price is sometimes shaded slightly.

Cut Nails.—The condition of the Cut Nail market is unchanged, excepting that mills are making shipments more promptly. We quote: $2.05, base, in carloads, and $2.10 in less than carloads, f.o.b. Pittsburgh, plus freight in Tube Rate Book to point of destination; terms 60 days, less 2 per cent. off in 10 days.

New York.—Requirements for Cut Nails at this point are moderate. Prices are unchanged at the following quotations for carloads and less than carloads:

Carloads on dock	$2.18
Less than carloads on dock	2.23
Small lots from store	2.30

Chicago, by Telegraph.—There seems to be little improvement in the demand for Iron Cut Nails, but the demand is only moderate and prices have remained unchanged at $2.30 for small lots from store. Floor Brads have continued to be in good request.

Pittsburgh.—We note a moderate demand for Steel Cut Nails and a continued scarcity of Iron Cut Nails, which bring premiums over regular prices. We quote: $2.05, base, in carloads, and $2.10 in less than carloads, f.o.b. Pittsburgh, plus freight in Tube Rate Book to point of destination; terms 60 days, less 2 per cent. off in 10 days.

Barb Wire.—The mills are curtailing their output somewhat in proportion to the decreased demand, while a number of mills have closed temporarily. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. off for cash in 10 days:

	Painted.	Galv.
To jobbers in carload lots	$2.60	$2.90
To jobbers in less than carloads	2.65	2.95
To retailers in carload lots	2.70	3.00
To retailers in less than carloads	2.80	3.10

Chicago, by Telegraph.—Orders for Barb Wire are light and the market is a little easier in tone, especially for Galvanized, which is selling at $3 and $3.10. Painted is steady at $2.80 for carload lots and 5 cents extra for small quantities.

Pittsburgh.—New business is very light and will probably remain so until fall trade opens up. Demand is confined to small lots only. Production has been very much curtailed by a shut down of a number of mills. We quote as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days: Painted, $2.60; Galvanized, $2.90; less than carload lots, Painted, $2.65; Galvanized, $2.95.

Plain Wire.—Orders, which until recently have crowded the mills, show considerable of a falling off. Quotations are as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. for cash in 10 days:

Base sizes.	Plain.	Galv.
To jobbers in carload lots	$2.00	$2.40
To jobbers in less than carload lots	2.05	2.45
To retailers in carload lots	2.05	2.45
To retailers in less than carload lots	2.15	2.60

The above prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

6 to 9	Base				$0.40	extra
10	$0.05	advance	over	base	.40	"
11	.10	"	"	"	.40	"
12 and 12½	.15	"	"	"	.40	"
13	.25	"	"	"	.40	"
14	.35	"	"	"	.40	"
15	.45	"	"	"	.75	"
16	.55	"	"	"	.75	"
17	.70	"	"	"	1.00	"
18	.85	"	"	"	1.00	"

For even weight bundles, 50 pounds and over, 5 cents per bundle advance on above.

Chicago, by Telegraph.—Some orders of moment are being booked by the mills and the jobbing demand is also fair, the market remaining steady, with sales made in a jobbing way at $2.20, from store.

Pittsburgh.—New orders for Plain Wire are light, the mills being employed mostly on old contracts. The tone of the market is fairly firm. We quote Plain Wire at $2 and Galvanized at $2.40 in carloads, f.o.b. at mill, with the usual advances for small lots.

Soapstone Goods.—Pike Mfg. Company, Pike Station, N. H., and 151 Chambers street, New York, quote the following prices on Soapstone Griddles, subject to a discount of 33 1-3 per cent., with an additional 10 per cent. on larger orders:

Round Griddles.

	Per dozen.		Per dozen.
10 inches diameter	$8.75	14 inches diameter	$16.25
12 " "	12.50	16 " "	18.75

Oval Griddles.

	Per dozen.		Per dozen.
8 x 16 inch	$13.00	11 x 22 inch	$22.50
9 x 18 "	15.00	12 x 24 "	27.00
10 x 20 "	18.75		

Foot Warmers are sold from the following list, which is subject to a discount of 40 per cent., with an additional 10 per cent. to the large trade:

Foot Warmers.

	Per dozen.		Per dozen.
4 x 6 inch	$2.50	8 x 10 inch	$5.00
5 x 7 "	3.12	8 x 12 "	5.62
6 x 8 "	3.75	10 x 12 "	6.25
7 x 9 "	4.37	12 x 15 "	7.50
7 x 10 "	4.75		

Sash Weights.—The market for Sash Weights appears to be in excellent condition, and the advances recently made, both in the East and West, are well maintained. Factories generally are short of stock and report a large demand, so much so that it is impossible for them to make as prompt shipments as usual. In view of this condition of things, even in the dull season, it is thought not unlikely that when the fall business opens there will be something of a scarcity of goods, and this fact will probably contribute to the strength of the market. Several of the manufacturers express the opinion that the price of Weights is likely to advance under the pressure of orders from the dealers, in view of the fact that factories may not be able to take care promptly of current business.

Sad Irons.—This line is in active demand, and the market, owing to this fact and the price of the raw material, is decidedly firm. Some of the manufacturers have recently made a slight advance, but others are quoting as before.

Oilers.—The condition of the market in Oilers is represented in the following quotations recently issued by Wm. Vogel & Bros., 37-47 South Ninth street, Brooklyn, N. Y. Terms, 60 days, or 2 per cent. discount for cash in 10 days, f.o.b. New York.

	Discount.
Chace's Pattern Steel Oilers, tin bottoms	70 and 10 %
Chace's Pattern Steel Oilers, brass bottoms	70 and 10 %
Improved Paragon Steel Oilers, detachable drip cup	70 and 10 %
Chace or Paragon Brass or Copper Oilers	50, 5 and 2½ %
Automatic Steel Oilers	45 and 5 %
Automatic Brass or Copper Oilers	35 and 5 %
Engineers' Drip Oilers	50 and 5 %
Steel Oil Fillers	25 and 5 %

		Per gross.
No. 701, Round Mowing Machine Oilers, steel, in bulk		$5.00
No. 701, Round Mowing Machine Oilers, cop. pl'd,	"	7.00
No. 701, Round Mowing Machine Oilers, japanned,	"	6.00
No. 698, Round Mowing Machine Oilers, steel	"	5.00
No. 698, Round Mowing Machine Oilers, japanned,	"	6.00
No. 699, Oval Mowing Machine Oilers, steel	"	5.75
No. 700, Dome Mowing Machine Oilers, steel	"	5.75
No. 710, Round Mowing Machine Oilers, copper plated, heavy	"	9.75
Comet Sewing Machine Oilers, polished,	"	3.25
No. 00, Sewing Machine Oilers, polished	"	3.25
No. 00, Sewing Machine Oilers, japanned	"	3.50

Extra spouts for all Oilers, brass or copper, 15 %. Tin, 35 %

Cordage.—The demand for pure Manila and Sisal Rope is light. Card prices issued by manufacturers give the base price of Manila as 13 cents and Sisal as 10 cents per pound. General quotations are, however, from 12½ to 13 cents for Manila and 9¼ to 9½ cents for Sisal Rope. Mixed Ropes are having a larger sale at lower figures, these depending upon the quality. Jute Rope is also being purchased to a considerable extent.

Glass.—Interest in Glass circles centers about the question as to the time for starting the factories in the fall. A committee was appointed at the meeting held in Cleveland on July 10, to confer with the Independent Glass Company and other outside manufacturers not present, and arrange for co-operation in not beginning the blast of 1902-03 before October 15. It is reported that the Independent Glass Company have since stated that they will adhere to their original plan of starting their factories September 1. While a large proportion of the Glass manufacturers are in favor of a late start, the position which the Independent Company are reported as having taken, may result in lower Glass prices in the fall if the American Company execute their implied intention of reducing wages. The Window Glass blowing machine, which it is understood the American Company are arranging to control, is expected to reduce the cost of producing Glass nearly one-half. There is nothing of interest in the local Glass market, which remains quiet. The Jobbers' Association quotations are as follows for single and double strength:

	Discount.
From store	88 and 5 %
F.o.b. factory, carload lots	89 and 5 %

Paints and Colors.—*Leads.*—The White Lead in Oil which is now going into consumption is being drawn, to a considerable extent, from purchases made some time since. As an indication of the demands made upon manufacturers during the present season, it may be stated that some makers have so far fallen behind their deliveries that they are asking the indulgence of their customers for a short time until they shall be in a position to fill orders promptly. Quotations are as follows: In lots of 500 pounds and over, 6 cents; in lots of less than 500 pounds, 6½ cents per pound.

Oils.—*Linseed Oil.*—There is an absence of large demand for Linseed Oil, orders being confined to present requirements for consumption. The market continues firm in tone and unchanged. Quotations, according to quantity, are as follows: City Raw, 67 to 68 cents; out of town Raw, 66 to 67 cents per gallon.

Spirits Turpentine.—Quite a large quantity of Turpentine was taken by canners and varnish manufacturers toward the close of last week, after which demand was light. Firmer advices from the South during the first part of this week resulted in a stronger market at this point, with more ready buyers and a slight advance in prices. Quotations, according to quantity, are as follows: Southern, 46½ to 47 cents; machine made barrels, 47 to 47½ cents per gallon.

PENNSYLVANIA RETAIL HARDWARE DEALERS' ASSOCIATION.

A SPECIAL MEETING of the Pennsylvania Retail Hardware Dealers' Association was held at the Monongahela House, Pittsburgh, on the 7th inst, President Moore presiding. C. H. Miller, chairman of the Insurance Committee, made a report, after which Mr. Simpson of Huntingdon was listened to on the subject of "Mutual Insurance." On motion of Mr. Bowers, seconded by Mr. Hegner, the report of the Insurance Committee was adopted. On motion of Mr. Miller, seconded by Mr. Byers, the second section of the by-laws was amended so that the admission fee to membership shall be $6 in advance, which fee shall cover all dues until the next annual meeting. President Moore appointed an Entertainment Committee comprising J. H. Bowers, A. Q. Casselberry and W. H. Taylor.

After a recess for lunch the meeting reconvened in the afternoon. Samuel McKnight having positively refused to serve as a member of the Executive Committee, L. C. Fox was appointed by the president to fill the vacancy.

The salary of the secretary was placed at $300 for the current year, contingent on sufficient funds being received to pay that amount.

The following persons were elected as directors of the Pennsylvania Hardware Mutual Insurance Company: C. H. Miller, Geo. L. Moore, Mr. Thompson, S. S. Bryan, C. J. Kirk, J. E. Digby, Geo. W. Hackett, J. H. Bowers, A. M. Gregg.

The following Legislative Committee were appointed by the president: S. S. Bryan, J. F. Frye, H. F. Robinson, John W. Seaman, J. B. Holderbaum.

On motion of Mr. Miller, seconded by Mr. Fox, ten members of the association shall constitute a quorum for the transaction of business. The meeting then adjourned.

CHICAGO RETAIL HARDWARE DEALERS' ASSOCIATION.

THE Executive Committee of the Chicago Retail Hardware Dealers' Association have decided to postpone the eighth annual picnic until Wednesday, July 30, two weeks from the original date, as the additional time will allow for more thorough preparation. An effort is being made to have a number of manufacturers and dealers from both the East and the West attend the outing, and success seems likely to attend the efforts of the committee. A circular letter is being mailed to all Hardware dealers throughout Chicago territory, notifying them that the tickets previously issued for transportation and the prizes will be honored on July 30 as though the picnic had not been postponed. In addition to the prizes already offered and mentioned on the original programme there will be a set of Auger bits offered by the Forest City Bit & Tool Company of Rockford,

Ill. The committee have received word that a representative of the Estate of P. D. Beckwith of Dowagiac, Mich., will be present.

NOTES ON FOREIGN TRADE.

BRITISH LETTER.

Office of *The Iron Age*, Hastings House, Norfolk St., London, W. C., July 12, 1902.

THE coronation fiasco being now ancient history, and the half year having turned, Hardware manufacturers and merchants are feeling their way for a return to steady business. The month of June has been a trying month to business men. Not only did the proposed coronation festivities seriously upset business, but there were difficulties in connection with the South African trade leading to no small anxiety. So far as the home trade is concerned, there is but little to report; trade is, on the whole, quiet yet not stagnant. Small orders are coming in to most factories, but large orders are hard to seek. Employment is fairly brisk, more so in Birmingham than in Wolverhampton. The disquieting feature is the almost complete absence of large orders.

Referring to the South African situation, it is fraught with perplexities. To begin with, American and German competition is promptly making itself felt, and the feelings of British exporters are not a little sore with the knowledge that sea freights favor the Germans and the Americans as against themselves. The air is full of rumors of greatly increased shipping facilities between the United States and South Africa, and the Germans are putting on an increased number of boats. It is feared that the result of this will be a serious extension of credit, with a probable collapse to follow. The feeling is that these boats must carry freights, and will therefore, through the machinery lying ready to hand, endeavor to push the goods upon the retailers to South Africa far too soon, and long before they are ready to pay It should be remembered that this is very apt to occur, and in fact generally does occur after every large war. If credit in South Africa is seriously impaired during the next few years, the result cannot fail seriously to affect the commercial welfare of that country. A more immediate trial to the exporter's patience is the difficulty of getting goods up country. It is stated with good authority that the restrictions of the military governors of the line are as yet scarcely abated.

In other departments of the export trade it may be said generally that the Australians are buying in fair quantities, and the New Zealanders in large quantities. There is an improved demand from Japan, and there have been some heavy shipments to South Africa. It is thought that the arbitration agreement between Chile and Argentina will lead to better trade, but the Venezuelan revolution is creating some little disturbance among the few shippers interested in that quarter of the globe.

MEXICAN TRADE.

THE following advices in regard to Mexican trade are from a well-known house in Monterey:

Business in this part of Mexico is in a very healthy condition and we anticipate an active trade for some little time to come. Mining is increasing very rapidly and many of the old mines are now putting in modern machinery. The only drawback is the low price of silver, which obliges us now to pay $2.38 Mexican money for $1 in gold. As a year ago the American dollar was worth $1.08 Mexican the shrinkage is considerable.

Ten years ago, when we started our business, the Hardware stores in this city handled almost exclusively tools of German manufacture, and we attribute our success very largely to the fact that we have never handled anything but the best grades of American and English tools. To-day there are very few German tools sold here, and we can safely say that in Monterey there is not a carpenter who does not know what a Disston Saw is and who cannot tell the difference between a Stanley Plane and the imitation one. As the custom house duties are levied on the weight of the articles imported without regard to their value, you will readily understand that it is very poor policy to import inferior quality goods. There is very little machinery imported from Europe for this part of the country, practically all coming from your country.

In conclusion we would draw your attention to the small risk of doing business with the Mexican people. Our bad debts have never yet passed $700 a year, and the few losses made have nearly all been with foreigners resident in this country. The Mexican is keen at a trade, but as far as our experience goes honorably carries out his part of the contract once it is made.

THE ADVANTAGE POSSESSED BY THE LOCAL OVER THE CONTINENTAL JOBBER.

THE following communication from a gentleman thoroughly familiar with the methods of the jobbing trade touches upon the advantage which the salesman of the smaller jobber possesses over his competitor representing a great and distant house:

To the Editor: There is much force in what you say about the hold the representative of the nearby jobber has on his customers, as compared with the great houses who are operating at a distance. When a big jobber starts out a new salesman he is generally a comparative stranger. He is given costs which may represent the actual cost to his employer or may conceal a profit, and is told of prices at which he must sell. The line is so large and varied that the odds are that there is much of it with which he has had no experience and must sell by following instructions blindly. He is given rules to follow based upon experience and calculated to steer him clear of all possible errors, and is told of dire consequences which follow a step aside from the path indicated. If he is an experienced man he knows what he must obey and where he can safely ignore instructions, but he is hampered by the past errors of others which have given rise to strict rules and by an endless amount of detail involved in the correct writing of orders and obedience to instructions. Cutlery must go on a blue sheet, House Furnishing Goods on a yellow one, direct shipments must be written separately, one on a sheet; Sporting Goods must be separated from the balance; lists and discounts and shipping instructions must be carefully inserted; collections made of previous bills; care must be taken to keep changes in prices on his large line posted up to the minute, and indeed his cares and limitations are hardly balanced by the prestige of his house and the extent of his line.

Where expediency rules with the small jobber the conditions are almost entirely reversed. The salesman is usually some man promoted from the counter to the road and intimately acquainted with the stock. He makes up his own list of goods, getting actual costs, and selects his own samples. He is confined by no hard and fast rules, nor is there at home undue fear of allowing him to make an extra concession when occasion demands. The relations between salesman and employer are intimate and personal, and the salesman's interest is not limited by the amount of his salary. He is trusted greatly and must be a person of some judgment, but the individual attention that his employer is able to give him helps him to avoid errors due to ignonance, and he is trained to usefulness, where in the big house he would be cast forth as an unprofitable servant.

Hendricks & Class, 150 Nassau street, New York, dealers in Heavy Hardware, Hardware Specialties and Ship Chandlery, have been appointed the direct representatives and export agents of Charles H. Hard, Buffalo, N. Y., manufacturer of Steel Rail Woven Wire Mattresses. They will make a specialty of introducing these Woven Wire Mattresses, which have new and distinctive features, to the steamboat trade for berths and staterooms. They are equally adaptable for ordinary bedsteads. Hendricks & Class have also been appointed the export sales agents for the W. Eddy Plow Company, Greenwich, N. Y. This company were established in 1832, and manufacture the Rough and Ready Plows, which has been their trade-mark for about 70 years.

SPECIAL BRANDS.

THE subject of special brands is evidently one in which both manufacturers and jobbers are still interested. We print below several communications in which the question is discussed and arguments *pro* and *con* brought out in an interesting and forcible manner. It will be seen that the quality of special brands, as compared with factory brands, is one of the points considered, while another is the relation these goods bear to the catalogue houses:

THE QUALITY OF SPECIAL BRANDS.

A JOBBER'S REPLY.

In reading the arguments of the manufacturers, which have appeared in *The Iron Age*, against special brands, I have been struck with what they seemed to accept as a self evident truth, that the manufacturer does not send out as perfect goods or as high quality goods under his customers' special brands as he does under his own.

IS THIS TRUE?

For nearly half a century every jobber in the United States has had his special brand of Axes; is it true that these goods have been the slightest bit inferior to the same goods sent out by the manufacturers under their own brands?

If it is true, it does not speak well for the intelligence of the retailers of the country, for not only have special brands sold as high as factory brands, but the trade can readily recall some specials that were at all times a little higher in price, and, what is more, readily sold at this higher price.

On the principle that example is better than precept and experience better than theory, the writer knows of one jobbing house who had a trade in Axes of 1000 dozen a season. Of these nine-tenths were sold under their own brand and the rest were factory brand. Now it is an absolute fact, and one that proved itself year after year for 20 years, that the returns under the warrant were never in the proportion of 9 to 1, but were rarely more than 6 to 1. This is fact, not theory.

Everything else being equal, it should have been far more unfavorable to the jobber's brand. And for this simple reason. Any salesman fit to be on the road will inevitably claim all that can be claimed for his own brand. The retailer to whom he is talking has a personal acquaintance with him and his house. The factory is merely a name. The retailer pushes out the goods on the strength of his acquaintance and confidence in the men behind the special brand, and more of this brand ought naturally to come back, for the purchaser expects more from it, and we all know how warranted articles are abused by the consumer and how tender the retailer is of his customers' feelings.

Is it true that jobbers and their army of salesmen and clerks have so little interest in their goods and so scant knowledge of the standards of quality that they are not able to discover when the manufacturer slights the goods under special brands?

It is quite true that we often have confidence that a manufacturer is going to send us exactly what we suppose we are buying and which he promises to send. And it is also true that we sometimes send out such goods trusting in the honesty of the maker, without making close inspection first; but when they are in the least degree slighted it is not long until our traveling men call our attention to this and to the defects they have discovered in that court of last resort, the retailers' experience with consumers.

But with 90 per cent. of our stock we do not take even this slight chance. If the manufacturers who have had experience will testify, I think they will admit that jobbers have not been the "easy marks" that other manufacturers, with no experience, seem to think they are. I think if the question is brought up at the next meeting of the manufacturers they will admit, *nem con*, that the jobber knows what quality means, and is not backward in demanding that he shall receive exactly what he orders and pays for.

There is another fallacy in the arguments of those who have written to *The Iron Age* as manufacturers. They seem to believe that jobbers are less ready to back up their warrant on their own brands than they are on goods sold under the makers' brands, and less willing also than the manufacturers themselves are.

WHY SHOULD THEY BE?

There must be a reason for that, if it is true. Can any merchant or salesman think of one? I admit that I am unable to hazard even a guess at what might be a reason that would influence the jobber to act this way.

I do not believe the statement is true in fact or in theory. I know that it is not true of any jobber whose men travel over the four States in which my principal trade lies. And there are several reasons why no jobber need take such a position.

The first one is that it would be a suicidal policy, and I am of the opinion that there is as high a quality of brain in the jobber's office as in the factory office that would be quick to see this.

The second reason, and one all sufficient in itself, is that as the goods are warranted to the jobber, as he has the right to return to the maker all goods returned to him by his customers, what possible inducement is there for his salesmen to deal with the retail trade upon any less liberal basis than the maker's warrant, liberally interpreted?

If, as our old friend, Patrick Henry, used to say, we should learn from the torch of experience, I would very much like to call up the first class on warrants from among the manufacturers of the country and have them recite their experience with jobbers. If one among them will testify that he ever found a jobber reluctant about taking back warranted goods I have a gold medal, in my mind, for that manufacturer.

It certainly could not be claimed by the Knife maker who stood here a few days ago, solemnly studying over a pile of Knives that a salesman had gathered from the trade on his last trip, and who turned to me saying: "I'd give a dollar to see the blooming fool of a man who would take back such goods from either consumer or retailer." Evidently he didn't think the jobber kicked over taking back his special brand under the warrant.

It couldn't be the concern to whom we shipped a broken machine, returned us by one of our best customers, and about which we received a long typewritten letter of four volumes, explaining why the warrant did not cover this particular kind of a break and we had no business to take the machine back from our customer. Being only degenerate jobbers, instead of sanctified manufacturers, we asked them to fix the machine at our expense and ship it to our customer. He will never learn from us that the warrant was so finely drawn an affair.

Perhaps the manufacturer who sent us a clipper with one tooth broken from a plain, black, jagged flaw, and who demanded 27 cents for a new plate, is the one who might claim the medal! Talk of experience with manufacturers about their warrants! Life is too short for it, for those of us who are gray headed in the service.

You will notice, as one argument, that "the up to date retailer who buys nothing but factory brands thereby places himself closer to the factory than if he has a jobber's brand." I thought of one of my customers who bought a couple of dozen Scythes this spring from a factory 700 miles away and had two Scythes returned. Somehow he didn't seem to be brought any "closer" to that factory, so he sent them to me to see if I couldn't overlook the fact that they were not our goods and send him two of ours in their place.

PRIVATE BRANDS.

BY FAIR PLAY.

I have been considerably interested in the discussion of this subject in your recent issues, and it does not seem to me that either Mr. Douglas of the Simmons Hardware Company or "Manufacturer" in his reply covers the subject fairly. Mr. Douglas takes an ex-

treme view even for an extremist among jobbers, and what might be fairly said in favor of jobbers' brands he does not say, because it would not harmonize with his line of argument, and the same points are overlooked by "Manufacturer," who confines himself to knocking over Mr. Douglas' pretty theories.

MANUFACTURERS TO BLAME.

The manufacturers have only themselves to blame if jobbers' brands have grown to be a hurtful factor. I have no doubt that the practice of private brands had its beginning in their injustice and rapacity. Makers of goods seem to be slow to realize that their reputation has a value only so long as they do not charge for it, and that as soon as they add a single cent to their prices because of the favor their goods enjoy they cut their own throats and drive themselves out of the market. A workman will buy a noted brand if he can get it at the same price as other goods that look as well and upon inspection seem to be as good, but when the price is higher he will hesitate before buying—if he does buy—the known brand. The retailer realizes this and cuts down his orders when a premium is asked; the jobber knows what the effect will be and cuts his orders, and if, as sometimes happens, it is a line which he has made a leader and he has nothing to put in its place he feels aggrieved. The Axe maker who added a premium to his own brand because he thought it worth more in the market could have done nothing which would be a greater incentive to the growth of private brands or hurt himself more.

WHEN THE JOBBER IS PINCHED.

There are a good many lines of goods in which two or three factories control the best trade. In the jobbing centers it is customary for a jobber who takes up a line to secure the control of it for his city or territory. It happens to every jobber at times that his relations with some factory of this kind are sundered, and he finds that his competitors have control of the leading lines, leaving him badly handicapped. When such a thing occurs usually the wily manufacturer has gotten on with the new love before he has gotten off with the old, and the first intimation the jobber has of the changed conditions is a notice that Whisht, Hush & Co. have exclusive sale of the goods in that market and will doubtless be glad to fill the jobber's orders. That this condition occurs time and again in every jobber's experience I have no doubt they will be willing to admit. In such a case the natural recourse of the jobber is to a brand of his own, either to hide the inferiority of the goods he takes up or some manufacturer's bad faith in supplying them in this way.

WHERE THEY BENEFIT BOTH PARTIES.

There are cases where jobbers' brands are a distinct advantage to both jobber and manufacturer. Take cheap Lawn Mowers, for instance. In the smaller cities and towns it would never do for the different dealers to handle the same brand of Mower. So the maker makes for the jobber two or three brands for the same Mower, but paints them differently, and the jobber satisfies all his customers with the different brands. Again, take Enameled Ware. The maker will work out a series of different color combination for his coating. He gives one jobber the control of one color for the entire country for, say, two or three years, and to another the control of another color. Or he may divide the country at the Rockies. Thus he gives an incentive to the jobber to push his goods and by making them distinctive in appearance helps to make them noncompetitive. He is thus able to do with jobbers' brands much he could not do were his own name upon all the goods in the different finishes.

JOBBERS' BRANDS CONTRARY TO ETHICS.

Under the old rule of the trade giving jobber, manufacturer and retailer his particular field, the maker to sell to the jobber and the jobber to the retailer, there should be no such thing as jobbers' brands, for if the rule were strictly observed it would imply good faith in all particulars and in usurping the maker's place in branding goods the jobber is overstepping his bounds. If the jobber is to be the middleman, marketing the maker's product, he should do it as the maker's agent and not as a maker or owner of the brand. The manufacturer has a right to be known in the transaction, and if he has waived his right until the breach of the custom is more honored than its observance the fault is his alone.

WHERE THE JOBBER'S BRAND IS INJURIOUS.

There are places where the jobber's brand is not only valueless, but is a drag upon the sale of the goods—and that is in fine Tools. Yet it is in Tools more than elsewhere that the jobber delights to work in his name. Skilled craftsmen are familiar with the best factory brands; many of them own catalogues of different factories handling the best Tools of the kinds they use. It is easy to sell them these brands, for the name means something—but with a jobber's brand it is different. The most of the craftsmen know that the brand does not represent any manufacturer's standard and the dealer is called upon to detail the excellence of the brand, the care the jobber uses in selection, &c., when in the other case a word would tell the story. Put the jobber's brand and the best maker's brand side by side at the same price and it takes argument to sell the jobber's goods. A manufacturer should never allow a private brand put upon fine Tools. If he does he loses any benefit he may derive from his special ability to suit the needs of expert workmen, and this gives him standing. Brown & Sharpe's and Starrett's and Stevens' Machinists' Tools are known to the trade in a way they never could be under private brands, and they are much better able to serve the people. Why should not the manufacturers of Carpenters' Tools keep their trade on the same basis?

ABOUT QUALITY.

I suppose that a jobber never yet set about inaugurating a new private brand of high grade goods but he solemnly registered a vow to keep up the quality. Yet it is not always done. I know of one jobber whose name grew into disrepute as a brand because in his anxiety to make a profit and to knock out a neighbor's first-quality brand he let the goods run down. He now has a new brand which is higher in grade than that bearing his own name, but the old struggle for the lowest price will, unless he changes his tactics, bring this brand where the other is, for despite all solemn assertions the manufacturer who shades the price will shade the quality.

THE WAY TO STOP IS TO STOP.

If the manufacturers are really opposed to jobbers' brands why not stop them? In this day of combinations there is hardly a line of goods the manufacturers of which do not act in harmony on points of vital moment. If the subject is of sufficient importance and the manufacturers will act in unison with each other the trouble would be ended. If the manufacturers decline to make private brands the jobbers must agree to sell makers' brands. Such a thing will, however, hardly come to pass.

MANUFACTURERS TO BLAME FOR SPECIAL BRANDS.

BY AN EASTERN MANUFACTURER.

The discussion of special brands in *The Iron Age* will doubtless result in much good to the manufacturer, the jobber, the retailer and the consumer.

It is an "open secret" that jobbers give their private brands the preference because of the larger profits they bear, and for this condition the manufacturer is largely to blame. Their prime incentive in business is to make money, and if I were a jobber I certainly would have private brands and instruct my travelers to talk them first, last and all the time in preference to the factory brand sold unrestricted.

Take, for instance, a well-known Axe, factory brand, costing the jobber, supposing it were sold by list and discount, say, 25, 10 and 5 per cent; the salesman visits a small town supporting two Hardware stores, and there are usually from five to eight competitive salesmen calling every three weeks on this same trade. Mr. Retailer inquires of salesman No. 1 the discount on "Jones' Handmade Axe," and is quoted 25 per cent., at which price he buys a few dozen. Salesman No. 2 will follow

up with a price of 25 and 5 per cent., then No. 3 and No. 4 go one better until some salesman will quote 25, 10 and 5 per cent., or flat cost.

A salesman is never sure of his ground on factory brands with a close buyer where prices are open, unless he at once quotes close to cost, not counting expense of transacting business, hence the wise salesman always pushes the sale of private brands so his competitors cannot cut below him and dissatisfy his customers.

This applies to nearly all well-known factory brands sold on an open price and on factory brands that the dealer insists on buying. If he wants five dozen the salesman will sell him two dozen of the factory brand at a loss—counting the cost of doing business—and three dozen "just as good" at a lower price on which the jobber can make a satisfactory profit.

Salesmen are instructed by their houses to give private brands preference over factory brands, with a long list of arguments to present to the retailer as to why it is better for them to buy private brands, &c., one of the most common being that the factory brand is sold by the jobber at, say, $15 per dozen and the private brand is the same quality, guaranteed, with a higher finish, put up in a more attractive way, and sells at $13.50 per dozen. For all this, as stated before, the manufacturer is largely responsible.

Place a fixed selling price on factory brands that are worth protecting, so the jobber is insured a profit, and then, and not till then, will he exert himself on factory goods, which, of course, are easier for his salesmen to sell.

If the manufacturer places a line of prices on his goods and absolutely holds the jobber to the fixed selling prices, soon the jobber will be pushing the factory brands on which he is allowed a satisfactory profit with as much force as he ever did a private brand. But the argument may be brought forward that this has been often tried and failed. Very true, but the reason of failure in nine cases out of ten has been because when a jobber did break over the line he was dealt with too leniently and the manufacturer turned a deaf ear to complaints—allowing "meeting competition," which a salesman can always find if he wants to cut a price and his house will permit it.

But when a manufacturer insists on prices being absolutely maintained, even cutting off the supplies of a jobber, if necessary, the trade will soon learn that the prices are not to be trifled with.

Cut prices, however, like the poor, will always be with us, and because restricted prices are occasionally broken cannot be construed as a failure any more than are our laws for the preventing of crime failures because they are all repeatedly violated, but punishment is sure to follow, and this should also be applied to the price cutter.

Jobbers are only interested in goods that please their trade and bear them a satisfactory profit.

We could cite an instance of one of the largest manufacturers in their line in the United States, manufacturing strictly high grade goods, largely under private brands, whose goods are in two-thirds of the Hardware stores, yet not one retailer in ten is aware of the merit of their goods under the factory brand, nor one consumer in a thousand; in fact, they are almost unknown to the consumer. Yet a competitive line, no better, is sold under the factory brand only, at restricted prices, handled by every jobber of note in the United States and by 75 per cent. of the retail dealers and well known to consumers.

The first factory mentioned cannot figure as an asset their hard earned reputation as manufacturers of good goods while the other firm have a valuable asset in their well-known trade-mark, almost equal to the cost of their factory.

A factory in the East was reorganized seven years ago with a paid up capital of $50,000. Their goods were of high quality and they commenced to market them through the jobbers entirely on a restricted price basis. They were repeatedly advised that prices could not be maintained, &c., and the first year they were caused much expense and annoyance, but to-day they are having almost no trouble, have an established trade with every important jobber in the United States, and an increasing export trade, which, by the way, enjoys no lower prices than those extended to the home jobber, and their trade-mark alone is worth to-day more than the original investment and their stock is worth more than $500,000. They work on factory brands almost exclusively, and the jobbers prefer them, not wanting private brands on which the factory will make no lower price than trade-mark goods, and if they make up a private brand it is with the distinct understanding that the jobber conforms to the factory's fixed price on a similar article, hence there is no incentive for private brands, they not being as easy to sell and bearing no better profit.

The following facts are self evident: Private brands work an injury to manufacturers in general, are not for the best interests of the retailer or consumer, but are the only way the jobber can obtain a legitimate profit on staple goods, under present conditions, for which the manufacturer is in a great measure responsible.

SPECIAL BRANDS AND CATALOGUE HOUSES.

A JOBBER ANSWERS A MANUFACTURER.

One of the manufacturers in your issue of July 17 is troubled because catalogue houses handle only manufacturers' brands, and he says, in as light and airy a way as if he were offering an extra 2½ per cent. to get the order from a competitor: "Give the retailer an opportunity to satisfy his trade by supplying him with factory brands, letting the catalogue houses handle the specials, and the situation would soon be materially improved." That is as easy as falling off a log!

When has the retailer not had full opportunity to get factory brands, if he wanted them? And if the jobbers have not been "letting the catalogue houses handle the specials," why isn't it just as easy for the factories also to keep their goods out of the catalogue houses? Nay, nay, Pauline! The manufacturers are not losing any sleep about not letting the catalogue houses handle their goods. Some of them turn down orders sent them direct, but they are careful to see that some jobber who has the goods shall know that the order is to be had if it is looked after. These manufacturers have two very keen pleasures: one, when they stand up before the retailers' convention and say: "We do not sell to any catalogue house;" and the other when a good, fat order comes from a jobber who is known to have a large trade with mail order houses.

Perhaps it would be well for all of us to occasionally remind ourselves that, like the Widow Bedott, "We are all poor critters."

JOBBERS AND CATALOGUE HOUSES.

BY E. F.

The articles in *The Iron Age*, July 17, contain various statements, some of which remain unanswered. One is the statement that private brands are not listed by catalogue houses; that all well-known factory brands are, and that catalogue houses quote them at the retailers' cost.

Catalogue houses are in the business to make money, not to see how many goods they can sell at cost, and the low prices they often quote are not to cut the retailer, but fearing a competing catalogue house will quote under them they dare not publish a price allowing them even the profit they desire, and when a factory sells them direct with the understanding that they publish prices allowing the retailer a fair margin the catalogue houses, as a rule, are willing to co-operate; in fact, are pleased to have uniform prices established for them so that they may know where their competitors are at. This I know applies to nine-tenths of the catalogue houses. Of course, there are those who oppose any proposition that does not originate with them. Here again is the manufacturer at fault for not assisting the catalogue houses to publish a uniform price, allowing the retailer a reasonable profit, and all lines of trade would be benefited.

Furthermore, no catalogue house of any importance would buy or list any jobber's brand, while the small catalogue houses that do not enjoy factory considera-

tion often illustrate a jobber's brand, and if an order is received for this special brand they take the liberty of substituting whatever they chance to have in their limited stock, for the average jobber does not hesitate to sell the small catalogue house. The jobber can use this argument as a "talking point," but it is without weight.

The catalogue house is not the arch enemy of the retailer who sells good goods at a legitimate profit, but it is the green-eyed monster to the dealer who tries to sell inferior goods at an exorbitant profit.

Heretofore in the discussion of private brands a very important point has not been touched—viz.: advertising. Factories are spending millions of dollars annually to make their goods well known to the consumer, hence easy to sell by the dealer, who reaps a profit on the factory brand—the demand being created by liberal advertising—unknown and unrealized, that no private brand could enjoy; in fact, how many factory brands are household names and practically sell themselves against a private brand a clerk would be forced to spend more time in selling than the profit would warrant if his time was of any value.

No sound reasoner can honestly contend that jobbers are unnecessary factors, for they save the average retailer annoyance, time and money on nearly all the lines the average Hardware jobber carries, and they are the means of distributing the output of many factories at a much less expense than could the manufacturers themselves, even adding the jobber's profit. Hence it is to the mutual advantage of all that they co-operate fully, not only in the distribution of goods, but the brands as well.

A. W. Douglas' comment on the quality of private brands applies especially to his own company who are large enough to have a special brand for different grades of the same goods, and while they take great pride in keeping the quality up to the highest standard on one particular brand, on other brands that they carry no claim is made for quality, simply branded to free them as much as possible from competition.

Not so with the small jobbers who have one brand, which a majority use on all lines of goods, and they will have their highest grade of Cutlery under a certain brand and the same brand and trade-mark on the cheapest Wringer or Gun they sell; thus their private brand carries no weight, signifies nothing, and is not looked on with favor by any one except the jobber who has it trade-marked; in fact, if a few of the "set speeches" delivered by the various buyers to their salesmen in regard to the quality of competitive private brands could be published in *The Iron Age* the regard for quality of private brands would drop below par; for if the jobbers themselves, who know about the quality of private brands, scoff at quality when a competitor's private brand is referred to, what respect can the dealer or consumer have for a private brand which to him is absolutely an unknown quantity?

THE OSBORN MFG. COMPANY.

THE OSBORN MFG. COMPANY, Cleveland, Ohio, are just getting settled in their large new plant, which will permit them to handle their business much more expeditiously than heretofore. They occupy a large two-story brick building, with their own power and electric plants, and large frame warehouses adjoining, with private switch running in between the two buildings. The company advise us that they are very materially increasing their equipment along many lines, and contemplate a much larger business during the next 12 months than heretofore. The showing of their last year, which closed June 30, proved especially satisfactory, in view of their cramped conditions and inability to fill orders with anything like the promptness which the best business methods would require. The company have recently issued catalogue No. 100, of more than 150 pages, devoted to their line of Brushes and Brooms, Foundry Supplies and Hardware Specialties.

GEORGE F. HAWORTH of Sadlier & Haworth, Toronto, Ontario, is in New York on a visit combining both business and pleasure. The house of which Mr. Haworth is a part are manufacturers of Leather Belting.

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PAINTS AS HARDWARE.

A Merchant's Arguments for Selling Paints, Varnishes, &c., in the Hardware Store.

WHEN one considers the Paint business and the advisability of these goods being sold in Hardware stores, the only question that arises is, Why have not the Hardwaremen controlled the Paint business? Why do not all Hardware stores stock Paints just as they would Locks or Hinges. It would seem that the Hardware store was the most natural place to buy Paints.

WHO SHALL HANDLE PAINTS?—However, there are to-day probably more merchants in the Hardware trade who do not handle Paint than there are who do sell this line. In many places the druggists are the Paint stores, while in smaller cities sometimes Paint is to be procured in the same store with wall paper and picture frames.

KINDRED TO HARDWARE.—Paint and Painters' Supplies are certainly kindred lines to Hardware. It is true that the Hardware stock to be up to date should consist of everything that the builder may require. The Hardware merchant is in close touch with contractors and builders, and can secure Paint trade as he does business in Builders' Hardware. Customers who are building are constantly going to him for supplies, and the Hardwareman has thus many opportunities for soliciting their Paint trade.

THE MATTER OF EXPENSE.—A stock of Paint and Varnish can be added without materially increasing expenses. Additional fixed charges, as rent, heat and light, are not incurred, and probably the selling force would not have to be increased.

FAIR PROFIT.—On the sale of house Paints there is a fair profit, and there is a handsome profit in Paint Sundries and Varnishes. About 25 per cent. can be made on the sale of any of the best brands of house Paint, while on Sundries and Varnishes the profit is from 50 to 66 2-3 per cent.

ATTRACT CUSTOMERS.—By enlarging his stock the merchant will attract more customers. This is especially true of Paints. These goods will, of course, attract Paint and Varnish customers, who will also require Window Glass, Locks, Bolts and Hardware specialties when doing the spring or fall painting.

EASY TO HANDLE.—A strong argument in favor of Paints is the fact that most of these goods to-day are sold in sealed cans, making a neat and clean line to handle with absolutely no waste. It requires neither much space nor a large capital for the Paint business. Shelf room is not absolutely necessary, except a very small amount for Paint Sundries.

THE MATTER OF QUALITY.—It is exceedingly important to sell high grade Paints, just as it is to sell first-class goods in any line. It is well to remember that the quality of the Paint sold is sure to be a constant reminder to the customer of the dealer. It becomes an advertisement and one that is easily seen. It is, therefore, necessary to use some precaution in deciding on the brand of Paint to handle. I.

THE UNITED STATES COMPANY.

REFERRING to the rumor which in some way became current that the United States Company had disposed of their Chicago branch, we are advised by them that it is absolutely without foundation, and that so far from having any thought of selling out they are making arrangements for a still more vigorous prosecution of their business. Their catalogue, which has been in preparation since last January, is now about ready to come off the presses, and several thousand copies will be distributed to the retail Hardware dealers of the country between now and the middle of August. The company advise us that they are well satisfied with their first six months' business and state that they are now selling several hundred of the best retail dealers in the Middle West as well as in the East. They refer to the fact that they have a good stock of Hardware at their Chicago warehouse, 215 Lake street, and on nearly all the lines they are handling are prepared to fill orders from that stock the day they are received.

Letters From the Trade.

Our readers are invited to discuss in these columns questions of trade interest connected with the manufacture or sale of Hardware. We shall be pleased to have a free expression of opinion on subjects deserving the attention of Hardware merchants and manufacturers.

10 Per Cent. Protection to Jobbers.

Referring to the difficulties which the large jobber encounters as compared with 15 or 20 years ago, a manufacturer in New England writes:

Even in those lines where quantity does not determine the price and where the manufacturer makes a variation in prices to protect the recognized jobber, the large wholesaler suffers a loss as compared with the 80's and early 90's; for the manufacturer's and the wholesaler's ideas as to what constitutes a fair jobbing profit are sadly at variance. The manufacturer who reserves 10 per cent. for the jobber usually feels that he has made a sufficient allowance. He himself is very willing to handle the smaller business for this difference, and he cannot see why the jobber with his equipment for selling goods cheaply cannot do the same, but the jobber, whose selling expense is greater than this difference, feels distinctly aggrieved at the manufacturer's injustice, and his business meanwhile suffers.

Resident Representatives of Distant Jobbers.

Some of the jobbing trade find it desirable to have resident representatives in States at some distance from the houses, who will thus be in a certain way identified with the interests of the merchants with whom they have to do. This condition is referred to in the following letter, in which our correspondent also calls attention to the disadvantages under which these salesmen necessarily work as compared with the representatives of the nearby jobbers:

I do not believe these salesmen secure much additional business by this arrangement, as I think that the merchants to whom they sell would like to know that the representatives are direct from the house, and are familiar with the stock of goods they have on hand and in touch with the latest improved goods the house is receiving and handling, and not feel that these representatives are on a cold trail. I know when a representative comes into a place of business the question is asked when he is ostensibly representing the factory or large jobbing house, "Are you direct from the house you represent?" When he says, "No; I represent this house, but have my office in another place," in most cases the merchant loses interest in him.

SIDNEY SHEPARD & CO.

THE last of June witnessed the removal of the offices of the Buffalo Stamping Works, of which Sidney Shepard & Co. are proprietors, from those previously occupied adjacent to their Clinton street plant to their new plant, which has been in the process of erection during the past year, in the southern section of the city on the line of the Erie Railroad. The company purchased a large tract of land and proceeded to erect an entirely new and modern plant for the manufacture of their extensive line of Sheet Metal Goods. A large six-story warehouse, in which six freight cars can be loaded or unloaded at once; an enameling department covering the length of a city block, and one of the main factory buildings, together with fire proof storage rooms, boiler house, &c., have been completed, and are now fully occupied and equipped. Contracts were let last week for the second group of factory buildings, two five stories high and one six stories high, which will be ready for occupancy during the coming winter. All of the buildings of this new plant are of massive slow burning construction and embody in arrangement, construction and equipment the latest ideas and developments in connection with the manufacture and handling of this class

of goods, which includes Enameled Ware, Stamped, Pieced and Japanned Tinware, Galvanized Ware, Sheet Iron Ware, Copper Ware, Aluminum Ware, &c. Each department is run independently by its own electric motor driven by Niagara Falls power, and the entire plant is brilliantly lighted by electricity from the same source. A most elaborate system of automatic sprinklers and fire protection has been installed and fire boat service is near at hand. The new plant is especially well located, for besides side tracks on its own premises it is within ten minutes' carting distance of the main freight depots of all the great trunk lines centering in Buffalo and of the lake lines and Erie Canal. The old plant employing 600 hands is still being run to its full capacity and will continue to be occupied indefinitely, certain departments being removed and consolidated with similar departments at the new works, and the room thus made available occupied by enlargement of certain branches, which have been greatly cramped for space. The main offices and warehouse remain at 145-149 Seneca street, as heretofore, where the jobbing department of the business is carried on, as this house is one of the oldest and largest handlers of Sheet Iron, Tin Plate and kindred supplies in the country. The recent establishment of a house in San Francisco makes eight exclusively wholesale establishments from which the goods manufactured and sold by the firm are distributed—namely, New York, Buffalo, Chicago, St. Louis, Kansas City, Denver, San Francisco and Seattle.

TRADE ITEMS.

SAMUEL M. NICHOLSON, president of the Nicholson File Company and American Screw Company, sailed for Europe Tuesday last. Mr. Nicholson was accompanied by his family, who expect to remain abroad the greater part of the season.

THE AMERICAN HARDWARE CORPORATION, New Britain, Conn., announce the election of A. N. Abbe of New Britain as purchasing agent.

"THE ONLY WAY" is the name of a pamphlet published by the American Appraisal Company of Milwaukee, Wis. It contains numerous testimonials from clients and a list of the manufacturers and others for whom the company have made appraisals in the United States and Dominion of Canada.

HARDWARE JOBBERS' PURCHASING COMPANY, Aldrich Building, 102 Chambers street, New York, is the title of a company organized as purchasing agents and commission merchants, with offices at the above address. This business was established July 1, 1901, and incorporated June 19, 1902, with a capital stock of $10,000, all of which is paid in, we are advised. The officers are: President, P. Doblin; secretary and treasurer, S. Doblin, the latter having been with the Biddle Purchasing Company for a term of 11 years, both in New York and Pittsburgh. C. G. Conner is associated with the company as buyer, having been with R. K. Carter, New York, for the past seven years. This company represent various jobbing houses in different parts of the United States, and are equipped to serve a few additional concerns.

WE are advised by Kitselman Bros., Muncie, Ind., manufacturers of Woven Wire Fence Machines, that by a special act of the Australian Parliament the heavy duty imposed on Automatic Woven Wire Fence Machines has been removed. This action was taken through the efforts of a member of Parliament from Toowang, which is one of the most extensive farming districts of the country, and where, as in other parts, the crops are greatly damaged by the kangaroo, rabbits and other animals. With the duty of $5 on each machine removed the cost is so much reduced that a greater number of farmers will doubtless begin their use, so that Kitselman Bros. expect to do a materially larger trade with Australia than heretofore.

FRANK WHITMORE, formerly for 20 years or more with the A. F. Shapleigh Hardware Company, has recently entered the service of the Witte Hardware Company, St. Louis, Mo. Mr. Whitmore will travel for the company in Iowa, his old territory, where he is well and favorably known to the Hardware trade.

HARDWARE SHOW WINDOW DISPLAY.

BY GEO. A. PICKENS.

MANY merchants claim it takes too much time to properly decorate show windows. Others are free to confess that they are short of ideas and plans for attractive displays. Never make a display by simply throwing goods into the window in a haphazard way, as this has a tendency to repel rather than to attract prospective customers.

It is impossible to have a specially fine show window all the time, but one can always have a window that is neat, tasty and will leave the impression on passers-by that the store is not run by a mossback.

ATTRACTIVE WINDOWS PAY.

The writer has never made an effort to get up an attractive window but he was more than repaid for it. There are so many advantages of an attractive show window that a merchant should make an effort to always have one. It is the best medium of advertising

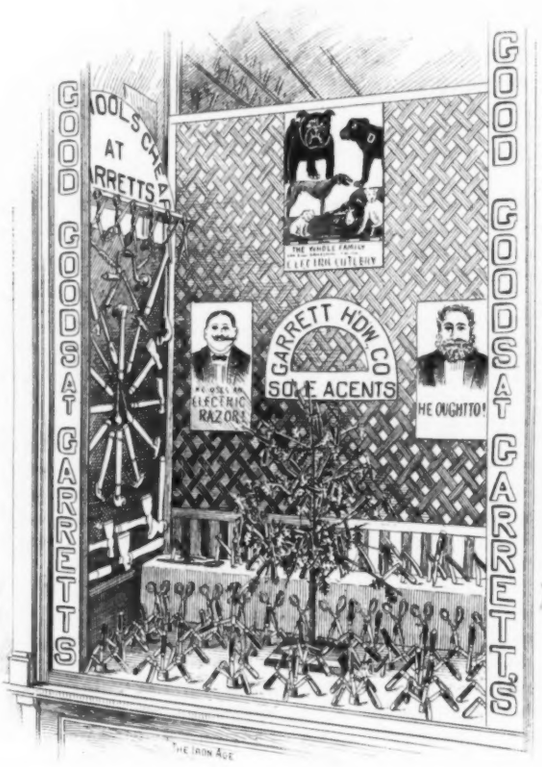


Fig. 1.—A Successful Cutlery Window.

and sells more goods than any other one thing. If a firm want their business to become more profitable let them give their windows some of the same quality of thought they do to their buying, book work, or collecting accounts. Let them give it earnest attention and strive to have something better each time.

FIXTURES.

One can make nearly all fixtures needed for window display work, such as shelves, tool racks, pyramids, stands, backgrounds, &c. In March the writer usually puts three or four strips across the back of his show window and covers them with with black cloth. Coat and Hat Hooks are screwed to these strips to hold Shovels, Spades, Rakes, Hoes, Hedge Axes, &c. On the side walls various displays of small Tools are made with a black cloth background. It is well to call people's attention to seasonable goods a short time before they are needed as the early display always seems to make a better impression.

MECHANICAL DISPLAYS.

It is a good plan to have something on the mechanical order once in a while, as it has a magical effect and attracts people especially to the store. Last summer the writer put in a display that attracted a crowd from early

in the morning until late at night. For the back of window scenery was painted to represent two mountain ranges with two big tunnels in them. On the floor was put blue grass sod, on which was a railroad track running in a circle into one tunnel and out of the other. Small farm houses and buildings were constructed out of tin and

Fig. 2.—Twisting the Trunk of the Tree.

painted attractively. Fences were put in to make the scene look natural and telegraph poles and wire followed around railroad track. Sand was put over the sod to represent the wagon roads. The scene was that of a model farm with real blue grass meadows. For the engine a toy motor was taken, and on it was put a tin boiler, smoke stack, cab, &c. Freight cars were made out of tin and marked with signs telling that they were loaded with various goods for D. T. Garrett Hardware Company. The motor was run by a set of dry batteries attached to the rails. A switch was in the circuit so the train could be started or stopped as wanted.

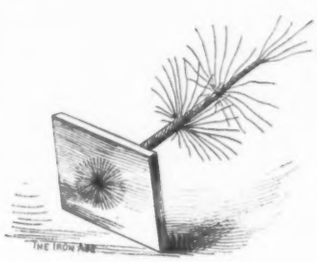


Fig. 3.—Showing How the Tree is Fastened to its Base.

Moving attractions are not good if used often, but occasionally they are all right.

A SUCCESSFUL CUTLERY WINDOW.

A Cutlery window that has been an exceptionally good trade winner is shown in Fig. 1. In dressing this window the back was first covered with light colored wrapping paper. Over this strips of bright red paper were pasted to form the lattice. Twelve inches above the floor of the window was a bench shelf 10 inches wide. The top of this was covered with red paper and dark blue paper was hung down the front to the floor of the window. On top of this bench shelf a row of Razors stood leaning against the back wall of the window.

Black cloth was used for the background on the side wall. On this was fastened a variety of small Tools, as shown in Fig. 1. Above these Tools was placed a shelf, and from its edge was suspended a line of 9-inch Japanned Bent Shears.

THE WIRE TREE.

On the bottom of the window was laid a covering of red paper, in the center of which stood a display stand of home construction in the form of a "Wire tree," shown in Fig. 1. This was made of 25 pieces of No. 12 Galvanized Wire, 36 inches long, 15 pieces 42 inches long and 5 pieces 48 inches long. The wires were then put through small holes in a board, the protruding ends being placed in a vise, as shown in Fig. 2. The board was then twisted, forming the trunk of the tree up to where the first branches start, or about 12 inches. The board was then lifted so as to release the 25 short wires. These were bent down for branches and the remaining 20 wires were twisted. The board was again lifted and the 15 42-inch wires bent down. This operation was once more repeated with the 5 remaining wires. The board was then lifted from the tree. Four of these five wires were bent down and one left to stand straight to represent the highest branch. The tree was fastened at the bottom to a board 12 inches square in the center of which is a ⅞-inch hole. About 2 inches of the trunk was

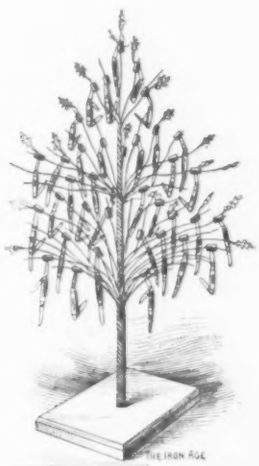


Fig. 4.—The Completed Tree.

put through this hole. The protruding wires were bent back and nailed to the bottom of the board as shown in Fig. 3. To the bottom of this board was fastened another board of the same size (12 inches square), forming the base on which the tree stands. This base was then covered with red cloth, or some other color might be used.

The next step was to push small corks on the wire branches, putting one to three corks on each branch. These corks are to stick the Knives in. Then green paper oak leaves were pasted to each cork. They added much to the natural appearance of the stand. A Knife was stuck on every cork on the tree, and it was ready for the window. The completed tree is illustrated in Fig. 4.

STANDING KNIVES ON CORKS.

The bottom of the window was covered with red paper. The tree was placed in the center and around it were grouped sets containing five Knives each, as shown in Fig. 5. Four of the Knives have one blade so opened that it stood at right angles to the handles. These open blades were stuck into a large cork so that the

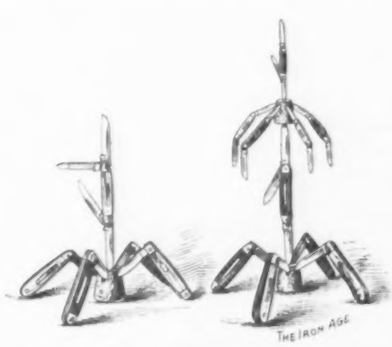


Fig. 5.—Grouping Knives Around Corks.

handles of the Knives rested on the floor of the window. The blade of the fifth Knife was opened wide and stuck in the center of the cork. Leaning on the floor against the side bench was a row of 8½-inch nickeled Shears.

THE CARTOONS.

On the top center of the back wall was a picture showing groups of dogs with a card under saying: "The

whole family can find something they want in Electric Cutlery." Directly below this was shown a semicircular sign reading: "Garrett Hardware Company, Sole Agents." On the left of this sign a cartoon of a clean shaven man neatly dressed was displayed. The inscription attached to this picture was: "He uses an Electric Razor." On the right of the sign was a shabby, unshaved individual who was labeled: "He ought to."

On each side of the window was pasted a paper sign giving the firm's motto: "Good Goods Sold at Garrett's." All the signs and cartoons used in the display were made in the store. The entire expense for all material used in the display did not exceed $2.

IT BROUGHT BUSINESS.

The effect on the trade was magical, as enough *more* Cutlery was sold the evening the window was opened to pay all expenses of the window trim. The display helped to sell lots of Cutlery and it showed the public that a large assortment of Knives, Razors and Shears was carried in stock.

THE GEO. WORTHINGTON COMPANY'S CATALOGUE.

THE GEO. WORTHINGTON COMPANY, Cleveland, Ohio, have just issued a fine catalogue, well bound in leather and cloth, containing 1440 pages, illustrating with descriptions and list prices such goods as are sold by the Hardware trade generally. There is a very complete index, occupying 32 pages, which is followed by a numerical index of Locks and Latches. The goods are divided into departments for convenience of ready reference, as follows:

Mechanics' and Edge Tools, Heavy Hardware and Pipe Fittings.
Locks and Latches and Builders' Hardware.
Farming Implements, Lawn Mowers, Pumps and miscellaneous Hardware.
Pocket and Table Cutlery, Razors, Shears, Scissors, &c.
Sporting Goods, Revolvers, Guns, Rifles, Ammunition, Dog Collars, Muzzles, &c.
Enameled and Japanned Ware, Pieced and Stamped Tinware, Tinners' Trimmings, Tools and Machines.
Blacksmiths' and Saddlery Hardware.

The catalogue is profusely illustrated, well printed on good paper, and contains a large and varied assortment of goods. Portraits are given of Geo. Worthington, the founder of the business, and of Gen. James Barnett, the president of the company. A view of the company's stores on St. Clair and Johnson streets, containing 5 acres of floor space, is also given. The catalogue is a worthy representative of the house, who were established in 1829 and incorporated in 1887. Upon application the company will furnish customers catalogues illustrating Sporting Goods, Carriage and Saddlery Hardware, Bicycles and Bicycle Sundries and Electric Supplies, aggregating an additional 600 pages.

ART METAL CONSTRUCTION COMPANY.

THE ART METAL CONSTRUCTION COMPANY, factories at Jamestown, N. Y., and St. Louis, Mo., with branches in ten of the more important American cities, issue a series of handsome catalogues illustrating and describing their product, consisting of metallic interior furnishings as distinguished from wood, in the line of Counters, Partitions, Shelving, Card Index and Slip Cabinets, Librarians' Cases, Ornamental Book Cases, Letter File Cabinets, Steel Vertical Files, Desks, Tables, Wardrobes, Lockers, Roll Top Desks, Typewriter Desks, Newspaper and Periodical Racks, Museum and Art Bookcases, Display Stands and Cabinet work of all kinds in metal. The extent to which this ever increasing type of office helps is now used is indicated somewhat by the character of the buildings in which the company's furnishings have been installed, including many public edifices in National, State, county and municipal governments as well as large business corporations, &c. In this category may be named the file rooms of the Senate, Supreme Court, Patent Office, Library and House of Representatives at Washington, State houses of 12 States, court houses and city halls in leading American cities, together with banks, insurance, railroad and telephone companies, many of the details of which are illustrated and described in the various catalogues published for gratuitous distribution. The adoption of this class of cabinet work likewise reveals the marked progress made in manipulating sheet metal, which for this work is principally high grade rolled steel. A noticeable feature of the work is the treatment of corners, edges, &c., the elegant hard, smooth finish, as a rule, being fine baked enamels, relieved by brass and bronze electroplating in any effect. There is also accomplished by the substitution of steel for wood a maximum of strength and minimum of weight, the protection of valuable archives and records against fire, reduced insurance costs and an enhanced appearance from an æsthetical standpoint. A factor in the development of this industry has been the increasing cost of wood and the tendency to a decreasing cost of steel, together with the great improvements in the kind of machinery demanded for the scientific manipulation of sheet metal.

SARGENT & CO.

SARGENT & CO., New Haven, Conn., and 147-151 Leonard street, New York, have recently improved the packing of their entire line of Carpenters' and Mechanics' Steel and Iron Squares. Relating to this line they have issued a booklet of 16 pages, which not only contains the complete assortment of their Squares and list prices, but also explanatory matter accompanied by sectional drawings and diagrammatic figures. Some of the Squares have the rafter table on them, which is also explained, showing the run, rise, pitch and cuts or angles of rafters, with a table of directions for the mechanic. Other explanations refer to Octagon Eight-Square Scales and the Essex Board Measure. One of these booklets, folded lengthwise, is packed with each particular Square, each Square now being protected with an envelope on blade and tongue, so that the purchaser is sure of getting the article in good order.

PRICE-LISTS, CIRCULARS, &c.

THE STOWELL MFG. & FOUNDRY COMPANY, South Milwaukee, Wis.: Folded pamphlet and price-list of the Atlas Malleable Shoe Lasts and Stands, Badger Reversible Shoe Lasts, Badger Lap Lasts, Stowell Heel Stiffeners and Stowell Shoemakers' Hammers.

THE JOHNSON & SHARP MFG. COMPANY, Ottumwa, Ia.: Ottumwa Ball Bearing Sash Pulley. A circular refers to these Pressed Sheet Steel Pulleys as having no rivets and as being light, strong, cheap and durable. It is pointed out that the Pulleys run on balls, requiring no oil, and are free from binding, cutting or noise.

RUSSELL & ERWIN MFG. COMPANY, New Britain, Conn., and 43-47 Chambers street, New York: Appendix to 1898 catalogue of the goods made by James Swan Company, Seymour, Conn., for whom Russell & Erwin Mfg. Company are sole agents. This company have also prepared set No. 3 of extra pages for insertion in their catalogue No. 9, showing between 40 and 50 pages of new goods. They have also recently been made the sole agents in New York City and nearby territory for the sale of Farm and Garden Tools made by Sheble & Klemm, Frankford, Philadelphia, Pa. This account was held for upward of 40 years, and until his death, by Peter McCartee, 79 Chambers street. Sheble & Klemm are also known as the Fairmount Fork Works, making steel goods in the way of Forks of almost every description, together with Ice Hooks, Steel Garden Rakes, Hand Garden Spades, Weeders, Sidewalk Cleaners, and a comprehensive line of Field and Garden Hoes and other Hoes for various purposes.

A. H. FUNKE, 98 Duane street, New York: Illustrated catalogue of the Baldwin and Full Moon Acetylene Bicycle Lamps, Autolytes, in a variety of styles and sizes, for automobiles and similar conveyances, designed to use acetylene gas, together with Kelecom Motors, made abroad, for motor cycles to be propelled with gasoline. The Bicycle Motors are of various capacities—namely, 1¾, 5, 7, 9 and 11 horse-power, air cooled, weighing variously 33, 110, 140, 240 and 300 pounds.

SAM'L C. TATUM COMPANY, Cincinnati, Ohio: No. 16, July, supplementary catalogue of Stationers' Inkstands and Glassware, &c.

THE CINCINNATI TOOL COMPANY, Cincinnati, Ohio: Catalogue of Hargrave Mechanics' Tools. These include a large number suitable for use by wood and iron workers.

HOFFMAN HINGE & FOUNDRY COMPANY, Cleveland, Ohio: Illustrated catalogue No. 9, includes Detachable and Nondetachable Screen Door Spring Hinges, Clothes Line Hooks, Door Locks, Fruit Jar Wrenches, Brick Baskets, Contractors' Hods, &c.

THE GLOBE-WERNICKE COMPANY, Cincinnati, Ohio: Two catalogues, one, No. 902, being devoted to illustrations and descriptions of Office Cabinet Supplies. The other, No. 502, relates to Filing Systems for banks.

HELLER BROTHERS COMPANY, Newark, N. J.: Horse Rasps, Files and Farriers' Tools. A 1902 illustrated catalogue and price-list is devoted to these goods.

E. J. MARTIN'S SONS, Rockville, Conn.: Kingfisher brand of Braided Silk Lines. A special catalogue is devoted to this brand of Casting Lines. These high grade Lines are in such demand, we are advised, that the makers have been unable to take care of all of their orders. They are now enlarging their plant to the extent of 50 new braiders, so as to be in a better position during the coming season to serve the trade.

THE PARISH & BINGHAM COMPANY, Cleveland, Ohio: Illustrated catalogue of Druggists' Tin Boxes and Cans, lithographed and gold lacquered.

A. J. HARWI HARDWARE COMPANY, Atchison, Kan.: Catalogue No. 40 of seasonable Hardware for the fall and winter of 1902.

BUTLER BROTHERS, New York: "Our Drummer," monthly catalogue No. 425, for July. This contains over 50 pages of goods adapted to the Hardware trade, on which net prices are given, which are guaranteed during the month or until their August catalogue is out. This concern do not sell goods to department stores or to catalogue houses, but confine their operations to dealers only.

AMONG THE HARDWARE TRADE.

The directors of the Boeseke-Dawe Company, successors to Edwards & Co., dealers in general Hardware, Agricultural Implements, Plumbing Goods, &c., Santa Barbara, Cal., have elected M. C. Faulding to succeed T. R. Dawe in the management of the establishment. Mr. Faulding has been identified with the business for the past 16 years and is thoroughly familiar with all its details.

Horton & Elliott, Ulster, Pa., have purchased the Hardware, Stove and Sporting Goods stock of H. D. Bolt. They are occupying a new building 24 x 48 feet in dimensions.

Sherwood Hall, Grand Rapids, Mich., has converted his Saddlery, Vehicle and Horse Supply business into a stock company, capitalized at $60,000, of which Mr. Hall holds $54,900. Mr. Hall is chairman of the corporation and Horace D. Shields secretary and treasurer. The style of the concern will be Sherwood Hall Company, Limited.

J. B. Richards, Hardware dealer, Orlando, O. T., has disposed of a half interest in his business to A. M. Pace. The business will, however, be continued without change of style.

O. R. Rich & Son have succeeded L. A. Young & Co. in the retail Hardware, Stove, Agricultural Implement and Sporting Goods business in Judsonia, Ark.

Boschken Hardware Company, San José, Cal., have remodeled their establishment, including a new front. The store interior has been given a modern appearance by the addition of display cases and other up to date Hardware fixtures.

Samuel Walter, in the general Hardware business in Dallas City, Ill., has been bought out by Frank L. Byler.

Garrison Hardware Company have lately engaged in business at Waldron, Ark. In connection with a retail business they will do some wholesaling. They occupy a new two-story brick building which is very conveniently arranged. The company handle Shelf and Heavy Hardware, Stoves and Tinware, Agricultural Implements, Sporting Goods, Mill Supplies, &c. They also have a tin shop and repair all kinds of machinery.

Chase & Lyon, Hoyt, Kan., have been succeeded by Lyon & Rippetoe, who will continue the Hardware, Stove and Farming Implement business at the old stand.

The Hardware store of J. F. Frye, Belle Vernon, Pa., was destroyed by fire a short time since. The fire made such rapid headway that it was only possible to save a small part of the stock. The loss was in the neighborhood of $6000. The store had been opened about a month and was attractively and conveniently arranged. Mr. Frye is now rebuilding and expects to be ready for business again by September 1.

Smalley & Case have succeeded D. H. Smalley in the Hardware, Stove and Sporting Goods business in Moran, O. T.

Deyoe Bros., who several months since purchased the business of Phinney Stove & Hardware Company, 1530 Market street, San Francisco, Cal., have altered and materially improved the establishment, and have also increased the stock formerly carried. Besides carrying Hardware and Stoves the firm also conduct a tin and plumbing shop.

W. S. Tufts has succeeded John Christenson in the Hardware, Stove, Agricultural Implement, Sporting Goods and furniture business in Witnee, Wis.

Frank M. Davis is successor to Davis & Co. in the Hardware, Stove, Farm Implement and Sporting Goods business in Blairstown, Iowa.

Foster & Wilson, Harbor Springs, Mich., are successors to Foster, Burke & Wilson in the Hardware, Stove, Tinware and grocery business.

Gallup & Bowers, Hardware dealers, Sparta, Minn., have been succeeded by William Gallup.

The wholesale and retail Hardware, Stove and Farm Implement business at Cynthiana, Ky., formerly conducted under the style of G. H. Watts & Co., is now being carried on under the name of Fred. G. Jenkins. Mr. Jenkins is building a 40 x 20 feet addition to the rear of the establishment, and putting in new floor cases and other modern fixtures.

R. C. Josey & Co., dealers in Hardware, Stoves, Farming Implements, Mill Supplies, &c., Scotland Neck, N. C., have been succeeded by Josey Hardware Company.

J. Scranton is successor to Lohr Bros., Cashion, O. T., and will continue the retail Shelf Hardware, Stove, Tinware and Sporting Goods business.

The Leslie Hardware Company, Sharon, Pa., with capital stock of $25,000, have succeeded the old firm of W. O. Leslie & Son, established in 1870. The officers of the new concern are John S. Leslie, president; P. J. Koch, vice-president, and N. L. Williams, secretary and treasurer. The company have moved into new quarters, consisting of two main rooms, 20 x 100 feet each, with 60-foot wareroom and plumbing shop in the rear. They do a wholesale and retail business in Shelf and Heavy Hardware, Stoves and Tinware, Agricultural Implements, &c., having also a plumbing and steam and hot water heating department.

L. M. Burlison has disposed of his interest in the Hardware business at Sherburne, N. Y., and has engaged in the same line on his own account at Edmeston, N. Y.

Bagley Bros. have sold their Hardware, Stove and Sporting Goods business in Creighton, Neb., to W. B. Warrington & Son.

Denison-Carder Hardware Company are successors to H. C. Denison & Son in the Hardware, Stove, Farming Implement and Sporting Goods business in Rocky, O. T. The new company report business on the increase and expect soon to erect a new building or make an addition to the present quarters.

Taggart & Thurber, in the Hardware, Stove and Sporting Goods business in Warrensburg, Mo., have been succeeded by Thurber & Christopher.

MISCELLANEOUS NOTE.

Banner Repair Links.

The Banner repair links, manufactured by J. W. Story Mfg. Company, Greenfield, Ohio, are made in five sizes, from 3-16 to ½ inch, inclusive. In order to repair a broken chain it is only necessary to open the link and connect the chain with each end and then close the link, without pounding or hammering.

Apex Match Holder.

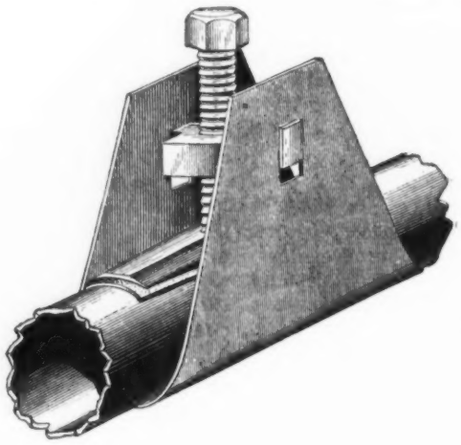
Plume & Atwood Mfg. Company, Waterbury, Conn., and 29 Murray street, New York, have recently put on the market the Apex match holder, here illustrated. This device is designed to hold a box of safety matches, which do not ignite until scratched on either side of the box in which they come. In use the entire box is slipped into the bottom space provided, which is so arranged

Apex Match Holder.

that the scratching surface can be used, as a portion of the metal on both sides is cut away for that purpose, thus exposing the sides of the box. The bottom is also partially cut away from end to end, so that any possible slight variation in boxes can be accommodated. The oval top is embossed, and in the center is a long longitudinal slot in which to drop the burnt match when done with, the confined space causing the extinguishment of the flame if carelessly put in while alight. The match holder is 2⅜ inches long, 1½ inches wide and 1½ inches high in the center. The match holder is stamped out of sheet brass, and can be supplied in antique copper, brass, nickel and japanned finishes.

Purdy's Pipe Clamp.

William Purdy, 222 Ninth avenue, New York, is the manufacturer of Purdy's pipe clamp, as here illustrated, which has been in use in the New York market for some time, but not introduced outside of that territory. These clamps are intended for use in emergencies for the immediate repair of leaks in all kinds of steam and water pipes, under any pressure, thus avoiding the immediate necessity of shutting down a plant for repairs, this device making it possible to repair the leak as soon as discovered, taking a more convenient time to cut out and renew a defective pipe. It is especially recommended for use by engineers, men in charge of pumping machinery, steamboat men, the janitors of buildings, and others using pipe for the purposes alluded to. The clamps are made in three sizes: No. 1 fits ½ to ¾ inch pipe; No. 2, 1 to 1½ inch pipe, and No. 3, 2 to 2½ inch pipe. The strap is made of cold rolled steel, the No. 1 size being

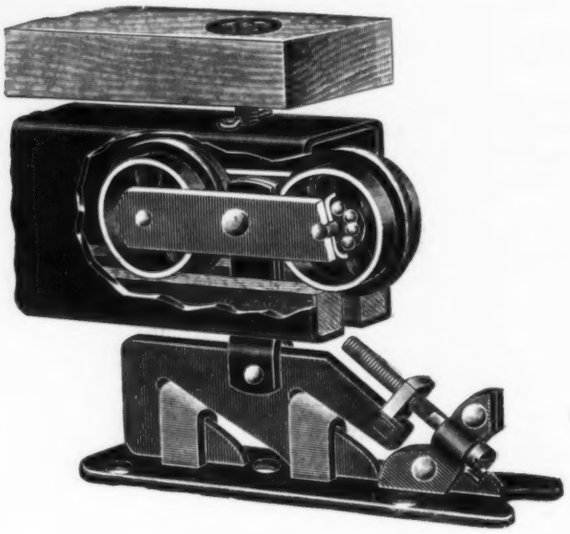


Purdy's Quick Repair Pipe Clamp.

18 gauge and the two larger sizes of 16 gauge. The steel strap of the smallest size is 4⅜ inches long and 2½ inches from top to bottom. In use the bolt and nut are removed, the strap slipped around the pipe, when the bed block covering a strip of rubber sheet backing is slipped over the leak and firmly secured in position by tightening the hexagonal head screw.

Wilcox House Door Hanger No. 222.

The Wilcox Mfg. Company, Aurora, Ill., have introduced a house door hanger of new design, shown herewith, which embraces the features of the trolley hanger and the advantages of the wooden shoe attached to the covered metal track. The hanger is alluded to as being noiseless and always clean, being protected from



Wilcox House Door Hanger No. 222.

dust, mortar and dirt, which would otherwise gather on the track. The track is adjustable, can be taken down if necessary, and additional adjustment to the hanger is shown by the set screw attached to the plate. The bearings are of the bicycle type, having balls, cones, ball racers, &c. The aim of the manufacturers in making the hanger has been quality rather than cheapness.

The Stevens Rifle Telescopes.

The accompanying illustrations represent new models of rifle telescopes put on the market by the J. Stevens Arms & Tool Company, Chicopee Falls, Mass., and New York office at 80 Chambers street. The Acme telescope, shown in Fig. 1, can be attached to any make of rifle. It contains a thoroughly corrected achromatic object glass and complete achromatic eye piece. The lenses forming the refracting systems are all made from the highest quality of optical glass, so ground and arranged, it is remarked, as to give the finest results obtainable. The mounting is referred to as the most perfect device for attaching the telescope to the rifle in a practical and scientific manner, and is guaranteed not to jar loose on repeated firing of high power arms with heavy charges. This mounting is universally adjustable, with fine micrometer screws and graduated collar, reading plainly to 1-1600 inch. The adjustment for both elevation and windage is confined to the rear mount and can be easily manipulated while looking through the telescope. The telescope is movable, thereby eliminating all danger, it is remarked, to the eye from the recoil of the gun, the slightest touch sending the telescope forward from 3 to 6 inches. This feature is alluded to as being valuable when used on guns so constructed as to render it impossible to operate them effectually while the telescope is in the way. The Ideal telescope, not shown in the illustrations, is furnished with the company's Aplantic eye piece, and carefully corrected achromatic object glass. The cross hairs are made from selected stock, fine, uniform in thickness and indestructible. The field is referred to as exceptionally large, defines sharply from the center to the extreme edge, giving a perfectly colorless image. The mountings are adjustable for both elevation and windage, and can be adjusted while the eye is at the telescope. The Favorite telescope, shown in Fig. 2, is described as having an exceptionally large, flat field, great brilliance and definition, fine indestructible cross hairs, and over 2 inches eye relief. It is made with browned steel tubing, ¾ inch in diameter. The mountings are made to exchange with the regular sights of the Favorite rifle. The elevation is obtained by means of a fine adjusting screw in the rear mount. This telescope is lower in price than those already described. The New Model telescope illustrated in Fig. 3 is especially designed for the company's Reliable pocket rifle, and is alluded to as the smallest rifle telescope on the market. Notwithstanding this fact it is explained, it is as regards field, illumination and defining power fully equal to the ordinary glass of four diameters. Its length over all is 10½ inches, and the diameter of the tube is 0.45 inch, weighing, with mountings, 4 ounces.

Fig. 1.—The Acme Telescope.

Fig. 2.—The Favorite Telescope.

Fig. 3.—The New Model Telescope.

Several months since the firm style of James A O'Neil & Son, Henderson, N. C., was changed to Maurice J. O'Neil, who has been for more than two years past the owner and manager of the business. Mr. O'Neil contemplates soon making extensive improvements in the store interior, so as to materially increase the attractiveness and convenience of his establishment. Mr. O'Neil's line embraces Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Sporting Goods, &c., which are handled at wholesale and retail.

Auger Bit and Chisel Sets in Compartment Boxes.

James Swan Company, Seymour, Conn., for whom Russell & Erwin Mfg. Company, New Britain, Conn., and 43-47 Chambers street, New York, are sole agents, have recently put on the market sets of auger bits and socket firmer chisels, packed in patented compartment boxes, as here shown, the illustrations being of a phantom character to show the construction of the box. The boxes are so made that chisels and auger bits are separated by a parallel or diagonal partition, which makes a proper receptacle for the goods and prevents rubbing against each other in handling them. It will be noticed that the boxes, which are of a durable character, have slide covers both top and bottom. A variety of Swan's auger bits are put up in these boxes, which contain 13 bits assorted 4-16 to 16-16 inch. In socket firmer chisels the tools are packed in different sizes of boxes, holding 5 and 12 chisels each, either plain, beveled or diamond back.

Fig. 1.—Auger Bit Sets in Compartment Boxes.

Fig. 2.—Socket Firmer Chisel Sets in Compartment Boxes.

Manly's Band Cutter.

The accompanying cut represents a device for cutting steel or iron bands on cotton or merchandise bales, the illustration showing the cutter both open and closed. It is explained that the cutting disk and shear jaw are made of the highest grade of selected tool steel, tempered to an extreme hardness to withstand the wear of months of constant use without being renewed. The straight shear is set into the point of the tool and is easily detachable, as is also the disk. The value of the rotary disk is alluded to because in operation it revolves, thus bringing a new cutting surface continually to the work. Each tool is supplied with an extra rotary and shear cutter. The handles are made of drop forged steel with hardwood grips, oil finished. It is pointed out that a most important feature of the cutter is the notch at the base of the shear jaw to prevent the band slipping beyond that point and curling up. In use the point of the cutter is inserted under the band, when the handles are brought together to sever the band nearly and quickly. E. C. Atkins & Co., Indianapolis, Ind., who are placing the cutter on the market, explain that the device is designed to take the place of tinners' snips or hatchet when opening bales.

Manly's Band Cutter.

Willcox Hardware Company, Marion, S. C., have been chartered with a capital stock of $10,000. H. M. Willcox is president of the company and A. R. Craig secretary and treasurer. The company handle at retail Shelf and Heavy Hardware, Agricultural Implements and Machinery, Sporting Goods, &c., also conducting a tin shop.